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intercom

THE MAGAZINE OF THE SOCIETY FOR TECHNICAL COMMUNICATION

INSTRUCTIONAL DESIGN

HOW TO DESIGN, DEVELOP, AND DELIVER CONTENT THAT SUPPORTS LEARNING GOALS

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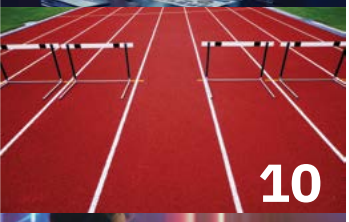

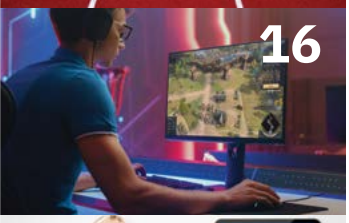

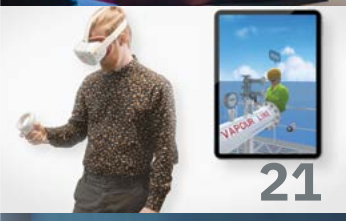

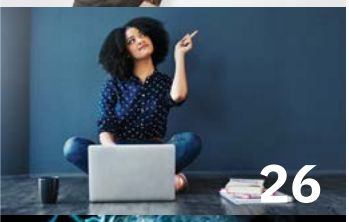

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A Note from the Editor

For many of us, we probably didn't give a whole lot of thought to instructional design over the course of our careers. That all changed in March 2020. Suddenly, it was all anyone could talk about. How were companies going to handle their customer training when travel was restricted? How were salespeople going to demo products? How were students going to learn online when the lessons were clearly designed for in-person interaction?

We may not be experts in instructional design, but we certainly know a lot more than we did — both as communicators and students/consumers. We've experienced the frustrations and pitfalls of poorly structured learning environments; two years into the pandemic, the grace period is over.

In this issue, Guiseppe Getto and Christina Mayr introduce the distinctions between information design and information architecture. Jennifer Goode highlights the pitfalls we should watch for, while Jamye Sagan shows us the wizardry of good instructional design. John Clement and Saul Carliner look at the impact of the pandemic on instruction, while Paul Milliman and Lene Thirup look at new ways of teaching using games and VR, respectively. Terence Pyle examines how medical device instructions for use (IFUs) play a huge role in educating clinicians. And finally, Edel Pace discusses what to look for if you're considering a career in instructional design.

I hope to see all of you this week at Summit! If you're interested in learning more about writing for *Intercom*, I'll be hosting a "Meet the Editors" session on May 16. ■

Alisa Bonsignore *(she/her)*

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Information Design and Information Architecture: Why Technical Communicators Should Care About These Fields

By Guiseppe Getto | STC Member
Christina Mayr | STC Member

Information design and information architecture provide opportunities for career growth for technical communicators interested in the audience-driven design, organization, and structure of content.

As a technical communicator, your career options are wide open. You may have begun your career as a technical writer only to move into technical editing. Or you may have followed your passion into a related field like content strategy, UX, or marketing. A quick look through the STC's Job Bank, or a job search engine like Indeed, will reveal the true diversity of roles that involve the effective communication of technical information.

During your journey through this field, you may have also encountered two less-understood roles: that of the information designer and information architect. In our experience as two people interested in the effective design, architecting, and deployment of information, you're probably confused by what these roles entail, especially if you've never worked in one of them. You may have even seen them used interchangeably by other practitioners or in job ads. And you may be justifiably confused as to the differences between these two roles, what they involve, and how they're related.

In truth, information design (ID) and information architecture (IA) are fields in their own right with their own professional societies, skill sets, best practices, and roles within organizations. At the same time, as with many roles that involve the effective communication of information, they are also roles that technical communicators can move into if their interests take them in that direction. To help you better understand these fields, below we review the scope of each, their associated skill sets, and where to learn more.

Defining Information Design and Information Architecture

If you search online for the term "information design," you'll find many different definitions, examples, and explainer articles. You'll quickly realize the term seems to entail everything from visualizing data to creating complex graphics. The International Institute for Information Design defines information design as "the defining, planning, and shaping of the contents of a message and the environments in which it is presented, with the intention of satisfying the information needs of the intended recipients."[1] Though many definitions for ID exist, this one is representative of several common elements, namely that the field:

- Involves planning as well as design
- Involves the development of content as well as the environment in which it appears
- Is driven by the needs of an audience

The field dates back to the 1980s[2] when researchers in academia first began publishing work that investigated how information should be designed within a specific format rather than being simply presented to an audience. And, of course, the way information is presented to audiences has changed dramatically during the intervening four decades.

> **Information design: Defining and shaping both message and presentation to satisfy the information needs of the audience.**

> **Information architecture: The practice of organizing, structuring, and labeling information so it's easy to find, use, and understand.**

If you search for "information architecture," you'll also find many definitions and examples for this field. You'll learn that this field has close ties to something called "data architecture," which is used in IT, and is also used in the development of complex websites. The Information Architecture Institute defines the field as "the practice of deciding how to arrange the parts of something to be understandable."[3] A better definition, which combines multiple sources, is: the practice of organizing, structuring, and labeling information so that it is easy to find, use, and understand (both in the real world and online).

Richard Saul Wurman coined the term "information architecture" at an American Institute of Architects conference in 1976 and

published the first IA book a year later. Wurman believed information design was about how information *looked* rather than how it is *accessed and used*. Wurman's astute observation neatly encapsulates the idea that IA is about creating systems of information rather than the delivery of information from within that system.[4]

Information Design and Information Architecture in Practice

Similar to related fields such as UX, content strategy, graphic design, and instructional design, information design is loosely organized and involves many professions and forms of practice. Arguably, any professional who is responsible for planning the implementation of information within a specific environment is using some elements of information design. At the same time, there does seem to be more of a focus on the design of *specific kinds of information,* such as data visualizations, infographics, maps, and interactive guides, rather than on the overall environment in which information is housed, such as websites, content management systems, or social media networks.

Information architecture also incorporates principles and practices from different professions. The biggest connections between IA and technical communication revolve around DITA, single-sourcing, and multi-channel publishing. But IA is really about order, structure, hierarchy, and, above all, efficiency. Efficiency of finding information and the connections between different systems that house usable data. Efficiency for writers, translators, and content operations staff. And, of course, efficiency for the end-users. Information architects simultaneously maintain holistic and detailed views of all published content within their control, planning the most likely paths to success for both sides of the screen.

Like ID, the work involved in IA is largely driven by the needs of the audience but focuses on streamlining *access to* and the *functions of* information rather than the final presentation. While it is true that some IAs do work on the presentation of content, it is not traditionally their purview. Where IAs and IDs align is that they both work to deliver the best content experiences for everyone involved, regardless of the format this content appears in.

Associated Skill Sets

Reviewing books and articles in information design reveals a wide-ranging list of associated skill sets. Many of these skills overlap related fields. They include, but aren't limited to:

- Visual design
- Usability
- Typography
- Color design
- Layout design
- Document design

These skills are typically employed in a wide range of environments, from working for a textbook publisher to creating interactive graphics on a website to helping a news agency present data to its audience across various channels.

Information architects generally work in enterprise-level content areas that deliver content for multiple products in a variety of outputs. IA draws from a variety of information- and technology-related disciplines, such as:

- Library science
- Front-end web development (such as HTML and CSS)
- Back-end web development (such as WordPress and Drupal)
- Database management and design
- Structured authoring, such as XML and DITA

Like information designers, information architects work in a range of industries, from healthcare to education. We've also seen technical communicators moving into architecture roles as they move from the creation of content to the managing of large-scale content across an entire organization or product.

Moving into Jobs in Information Design and Information Architecture

Information designers often find jobs as graphic designers, web designers, or instructional designers, among other professions. They are people who are talented at not only design but at understanding the needs of users for a specific type of design (e.g., designing a flowchart for a

medical procedure represented in a brochure so patients can understand what their recovery will be like). They are competent in visual design but also understand that all information must be appropriate to its context and intended environment.

> **New roles in ID and IA can be natural moves for technical communicators who want to focus more on defining context as well as content.**

Information architects organically emerge as an organization's content gets more complex. Their roles often grow out of supporting technology that needs more orchestration and governance, such as a complex authoring tool or content management system. The organization realizes they need an employee who does not also have to write and deliver content, but rather to shape the entire system in which that content lives. The vast majority of information architects transition into the role from content development roles (i.e., technical writing, web development and design, UX, library science) or, less frequently, software development roles. Professionals can move into information architecture work by researching and continuing their studies in user research, metadata, taxonomy, and industry-specific technologies supporting the content publishing pipeline.

Teaching, and Learning About, Information Design and Information Architecture

Professionals seeking to teach or train information designers should consider introducing learners to practices associated with the design process. This can include the process of assessing user needs, developing wireframes and prototypes, testing the prototype, and implementing it within a specific environment. It can also include best practices in design such as the appropriate use of contrast, alignment, proximity, repetition, and other elements.

Content professionals or managers training or teaching information architects should focus on teaching how to seek, define, and understand content and user problems at the deepest level; understanding the users themselves; and, finally, the more tactical aspects of IA: information organization, categorization — both within and outside digital confinement — and taxonomies.

Main Take-Away: Useful Fields with Many Opportunities

As you move through your technical communication career, you will doubtless encounter new opportunities to reskill, learn, and grow. You should strongly consider opportunities in information design and information architecture if you:

- Want to move from developing content to the design of content.
- Want to move from dealing primarily with audiences of technical documentation to dealing with users of information systems.
- Want to explore advanced publishing and information management options such as single-sourcing, multi-channel publishing, and the creation of complex websites
- Have a background in a related field such as UX or graphic design.

As we've mentioned throughout, many information designers and information architects are made, evolving into these roles from other professions. Looking around your current organization, as well as jobs available in the broader field, is probably the best way to start exploring the world of information, whether you want to become a designer or an architect. ■

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Suggested Reading

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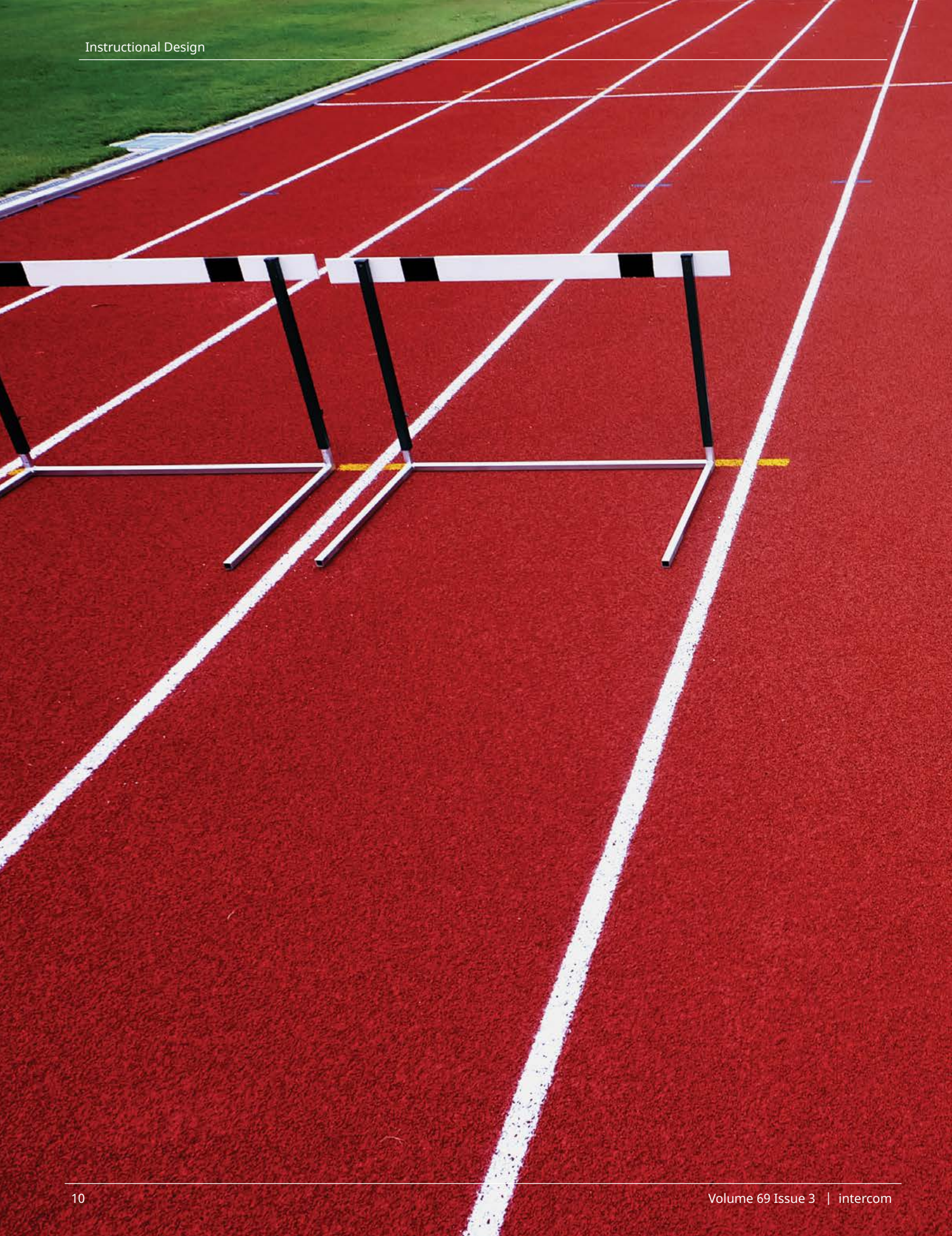

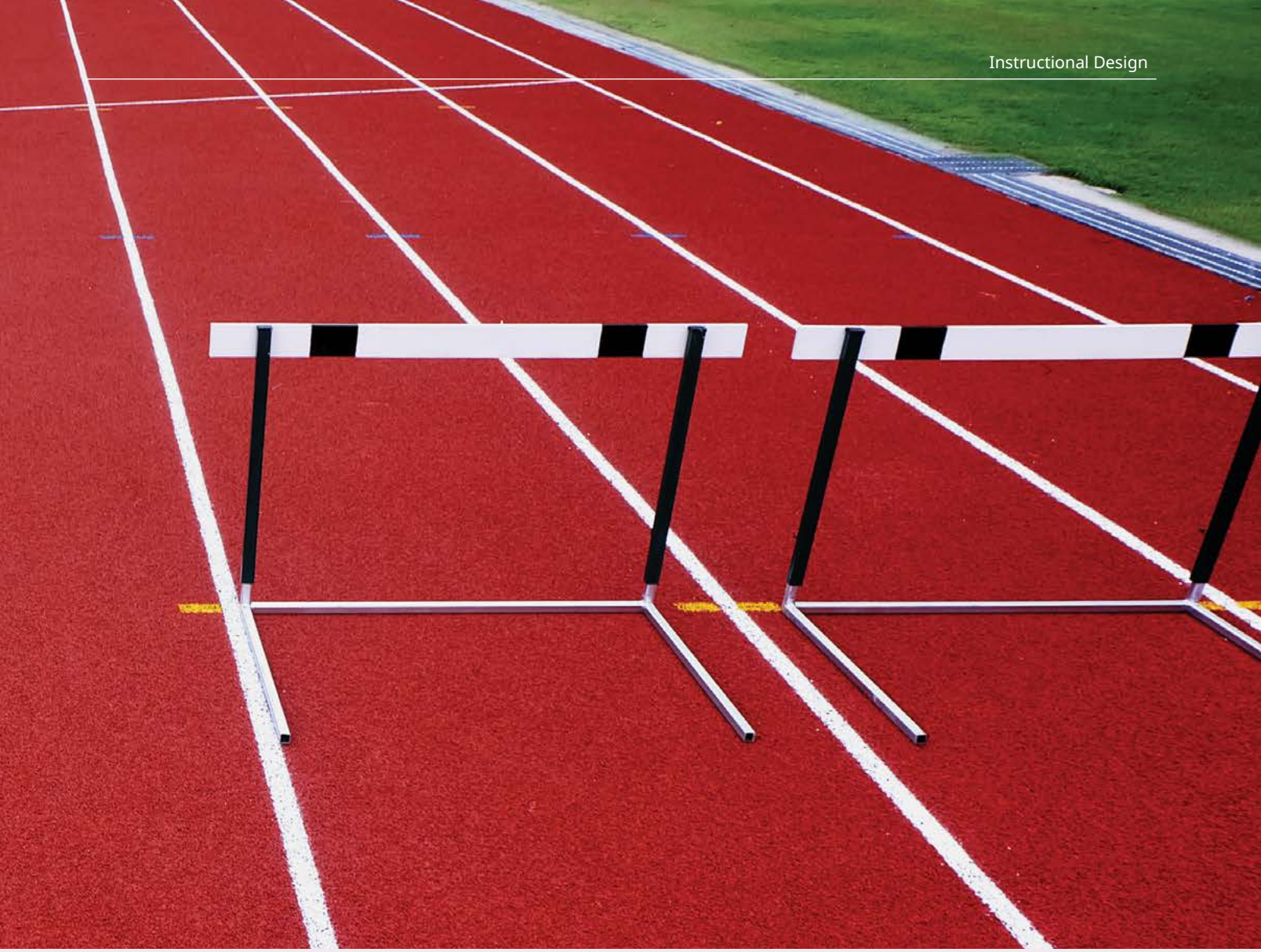

12 Instructional Design Mistakes to Avoid

By Jennifer Goode | STC Senior Member

Avoiding these pitfalls can help to support individual learning needs and increase the likelihood of instructional programming success.

Whether your team is creating instructor-led training, virtual training, self-paced e-learning, a user manual, an infographic, or other instructional initiative, avoid these 12 mistakes during your instructional design efforts to yield more effective learning outcomes.

1

Using training/instruction when it's not needed

Organizational problems can often be solved through training or instruction. But what if training isn't the appropriate solution? If training or instruction is applied without a preliminary critical analysis, learners may become frustrated and the organization will have wasted resources on a "solution" that doesn't adequately address the real issue. In other words, the problem still exists. By performing a gap analysis — or an examination of current and future states — you can identify what's going on and then dig in deeper to find the root of the problem. When you do so, you should discern the type of problem you're addressing. Training or instruction will only solve gaps in knowledge, skills, and abilities. New technology, better communication, or new processes can also solve real problems. Find the root of the issue first and then adopt the solution that is necessary to solve it — even if that solution isn't training or instruction.

2

Skipping the SME

A subject matter expert (SME) can provide insights and details about the content, the context, and the environment surrounding the training topic. They can also provide insights related to the targeted outcomes and behaviors for the learners. Failure to meet with these key information sources could be detrimental to the contents of your instruction, as well as to the outcomes it aims to produce.

3

Including too much content

Instruction should be targeted to meet the specific needs identified during the gap analysis. Providing too much content can overburden learners and detract from the most important subject matter. In order to keep learners focused on and motivated toward the targeted information, keep content simple, direct, and purposeful.

4

Taking too much time

The learning experience should serve to help the learner solve a problem and then return to work to apply what they've learned as soon as possible. If an instructional program is excessive in length, the design may inhibit the learner from returning to the job to solve the initial problem. Keep the training length appropriate for the depth and amount of content.

5

Using the wrong delivery method

Not every instructional program should be delivered in person. Sometimes an e-learning platform will be appropriate; other times, a targeted infographic, manual, or website will suffice. Selecting the wrong delivery method may put training completion or learner comprehension at risk. Understanding the learner's problem, situation, and motivations can provide insight into which delivery method would be appropriate, given time, staff, and other resources available.

6

Ignoring style, tone, and visual standards

An organization's guidelines for content consistency should be adhered to strictly — especially during instructional programming. Not only do style, tone, and visual consistencies increase readability and content efficiencies, but they also increase learner trust. If a learner observes that an e-learning course is branded with the company logo and follows text, color, and format standards, they likely connect the experience to their employer, rather than questioning the validity of its contents.

7

Skipping user testing

Engaging in user testing can help your team understand completion statistics, engagement trends, and learner perspectives on your instructional program. Furthermore, comprehensive user testing can identify problem areas, such as programming bugs, confusing terminology, or content inaccuracies. Even if you have limited time to execute a full user test, conducting a brief one can yield valuable insights that can help improve your instructional program prior to release.

8

Ignoring DEI considerations

Representing diversity, equity, and inclusion (DEI) initiatives within instructional programs is important for your program's success. Because learners seek to see themselves in training scenarios and connect in meaningful ways with the content, you should integrate diversity efforts throughout the program. DEI can be incorporated in text, graphics, narration, presenters, and learning scenarios to enhance the overall learning experience and build strong outcomes.

9

Forgetting accessibility

Not everyone accesses information in the same way or prefers the same delivery method. Provide multiple formats to support accessibility and preferences in your learning program. Accessible content might include closed captioning for videos, alt-text for graphics, text-based explainers that are accessible by screen readers, and content controls like play rate, volume, or text size.

10

Failing to develop a communication plan

If a training initiative doesn't have a communication plan, learners will have a hard time understanding why the program is important. Develop a learning narrative to use within the program to convey the importance of the learning and connect outcomes to organizational mission, goals, or values. Then, establish a communication plan external to the program so that leaders, managers, and training staff can effectively communicate why the learning program brings value to the employee, team, or organization. Broadcast the message in program advertisements, during registration, in meetings, and in after-program reports. Again, use the organizational mission, goals, and values to establish a simple, repeatable message that provides a clear rationale for participation.

11

Omitting measurement and evaluation

Gathering data before, during, and after a training program can provide important insights to learners' reactions to, comprehension of, and application of program content. Establish a measurement plan early on and collect the right information for the decisions you plan to make. Then, form an evaluation team that will ensure the best data collection methods, support data quality, and review results to gain insights to the learning experience.

12

Skipping the lessons learned and course improvement

Following the conclusion of the learning initiative, gather stakeholders, SMEs, instructors, instructional designers, evaluators, or other team members to reflect upon the overall program. What worked? What didn't? Did learner behaviors change? Are outcomes and targets being met? How could the program be improved in its next iteration? A thorough reflective discussion focused on lessons learned and course improvement could yield better outcomes for your current program, but also key insights to make your next initiative even better from the start.

Instructional programming encompasses a wide spectrum of inter-related activities that an instructional designer must coordinate and oversee. Remembering to avoid these 12 pitfalls can help ensure the learning program is appropriately supporting individual learning needs and connecting to organizational values and goals. Doing so will also increase the likelihood of instructional programming success. ■

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Playing the Past: Learning History Through and With Games

By Paul Milliman

A well-designed educational experience can go beyond the traditional textbook and classroom format. By meeting gamer-historians where they are, the University of Arizona is building a new model of experiential learning.

When I was asked early last year whether I wanted to help build a program that would award college credit for playing the soon to be released *Age of Empires IV*, I jumped at the opportunity. Playing computer games is the first way many young (and not so young) people encounter medieval history, and I wanted to meet these gamer-historians where they were. That same semester I was teaching our senior capstone course, and one of the very best students in that course was someone I had never worked with before. Early in the semester I asked him how he had learned so much about medieval history, and he somewhat embarrassedly told me it was from doing research online while playing computer games, especially *Age of Empires II*. I wanted to help give talented students like this somewhere to go other than just Wikipedia. And so, the University of Arizona Enhanced Experience for *Age of Empires IV* began to take shape.

As far as I am aware, this is the first time a computer game production company (Microsoft's World's Edge) and an academic institution (the University of Arizona) have collaborated on a project to award college credit for playing a historical video game. Games, however, have played and continue to play an important role in many history courses. I teach courses about and with historical games, as does my partner in the *Age of Empires* endeavor, Dr. Alison Futrell, Head of the University of Arizona's History Department and Associate Professor of Roman History.

Connecting Historical Facts with Modern Perceptions

In our courses we also guide students in analyzing how representations of the past in popular culture help to shape our understanding of history. For the most part, computer games had been marginalized in academic history, but this changed last year when the *American Historical Review* — the journal of the American Historical Association — began reviewing computer games in recognition of their importance in shaping historical understanding. The inaugural reviews in this issue (March 2021) were accompanied by a wonderful article by Andrew Denning, who argues "Historians should understand how video games shape the wider public's knowledge and philosophy of history, and they should develop strategies to bring the virtues of play into their own research and teaching." A few months later, Ted Scheinman wrote an article for *Smithsonian Magazine* (October 2021) about the growing trend of history professors teaching with video games. Teaching with games had finally gone mainstream!

Computer games had been marginalized in academic history, but that changed when the journal of the American Historical Association began reviewing them in recognition of their importance in shaping historical understanding.

A Change in Teaching Methodology

The timing of the development of the University of Arizona Enhanced Experience for *Age of Empires IV* also coincided with a radical transformation in my own teaching philosophy and a redesign of my university's General Education program to emphasize undergraduate research and experiential learning. When I first started teaching online more than a decade ago, my online courses looked exactly like my in-person courses: lectures, textbooks, essay exams, and term papers. I didn't understand the freedom that comes with online instruction, and as an assistant professor, I was a little concerned about upending decades of tradition. It has been a slow process, but over the past decade I have created born-digital courses that look nothing like what I taught in the classroom in the 2000s.

The first things to go were the textbooks and readers. History textbooks are expensive and useless. They don't teach you how to do history. They just perpetuate the myth that history is memorizing names and dates. As for the readers, why rely on sources someone else thinks are important? Because there are many good English translations of primary sources available for free online, or through my university's library, I could tailor the primary sources to my courses rather

than having to make my courses match primary-source readers.

The next things to go were the long lectures. Why are lectures so long? Because you have to fill 150 minutes of class time each week. How much learning is actually taking place? I personally can't pay attention to someone talking at me for that long, so why should I expect my students to? I usually record a brief lecture for each module to introduce students to the primary sources they will analyze and the assignments they will do, but that's it. I have become far more respectful of my student's time since I began to look at the courses more from their point of view. How long would it take them to do this reading or assignment? I began putting this time in my instructions, which I continuously revise based on student feedback to make them as clear as possible.

Focusing on Learning Outcomes

Rather than filling class time, I began to think about how I could most meaningfully have my students use their time. The biggest change in how I thought about time came when I moved to teaching seven-week semesters. I had to completely revise my courses, and if I could not justify to a student why I asked them to do something, I excised it. The most important thing I excised from my courses were term papers and tests. Doing this allows me to focus more on undergraduate research and experiential learning.

I used to teach using two separate scaffolded tracks of assignments for students — the content track, which focused on preparing them for the midterm and final exams, and the research track, which prepared them to write the research paper. Some of the exams and essays were good, but most were not. A lot of the time I felt like a judge on "Nailed It!" Most of my students really tried their best, but very few of these students had the inclination or ability to be a professional historian in the way I am a professional historian. Were these really the best ways of assessing a student's historical thinking skills? How could I nurture my students' love of history by working with them to develop and refine historical thinking, researching, and writing skills in non-traditional and more engaging ways?

I think that if I had not already been asking myself these questions, I would not have been prepared to help develop the *Age of Empires IV* program. There was no blueprint for anything like this, which was both liberating and daunting. Generally, historians are not very good collaborators, especially when it comes to course and curriculum design. There was a learning curve for me, but I firmly believe that the future of the academic discipline of history is in collaboration, especially in public-facing projects, so I wanted to help show what this future could look like.

> **I wanted to show people that having fun and being academically rigorous do not have to be mutually exclusive.**

Representing history through the game

Age of Empires IV presents different forms of history. First, there is the interactive narrative of fighting through various battles from England to China, covering nearly five centuries of history (1066-1552). There are Augmented Reality bridge videos between the battles which show how these past and present places are connected. And finally, there are "Hands-on-History" videos which are unlocked through your victory in a particular battle. These mini documentaries, shot on location throughout Europe and Asia, demonstrate how things were made and done in the past.

Professor Futrell and I wanted to build on this structure, so we created our own unlockable content for the game, called "Illuminated Histories." These are Atlas Obscura style deep dives into the larger history surrounding the events the gamer-histories reenact in the game. We analyze medieval images and texts to help the gamer-historians understand more about the civilizations depicted in *Age of Empires IV*. We also model how to use open-access resources that the gamer-historians could use to do their own historical research, because our goal is not just to have them earn a college credit. We hope that credit will be the first in earning a degree from

Arizona Online. In order to earn the credit, though, the gamer-historians first have to be assessed at the conclusion of all the campaigns.

Gamification as a University Recruitment Tool

I designed a gamified assessment — an online scavenger hunt in which the gamer-historians do guided research in the online collections of some of the world's leading museums and libraries — both to determine whether they had completed the whole University of Arizona Enhanced Experience for *Age of Empires IV* and to measure their willingness to engage in historical thinking and research. They can take the assessment as many times as they want to, and once they pass it, they can apply to Arizona Online. If they are admitted, they earn the college credit. But this is just the beginning, we hope.

I have developed a special course just for the gamer-historians who enter Arizona Online through this program, Playing and Making History with *Age of Empires IV*. It is designed to be a bridge course that will enable gamer-historians to build on the skills they developed in the University of Arizona Enhanced Experience for *Age of Empires IV*. This is an active learning course designed to be a bit like a research and writing boot camp for historians, allowing them to apply the history they learned.

Gamer-historians learn how to:

- Use a variety of databases and other research tools to study history
- Summarize and critique scholars' arguments
- Do original research and share it with their classmates through fun and engaging research projects based on playing and making pedagogies

They do just as much learning and research as in a traditional history course. But, instead of presenting their learning and research in tests and term papers, they present their research through experiential learning activities like cooking medieval recipes, creating medieval objects, or making their own games. They are not just consuming history — they are producing it, just like the Hands-on-History videos they watched in the game. They are doing their own hands-on history; in my opinion, experiential learning is the best way to learn history.

Unlike math and foreign language courses, most history courses have no prerequisites, yet there's an expectation of a certain level of content knowledge for participation. Too much time is spent on content acquisition because of a false assumption that without this, students cannot do research on this topic. Why not learn the content through doing research?

> **Why not learn by doing instead of simply hearing or reading about something?**

An Inclusive and Engaging Learning Experience

All undergraduates can engage in guided historical research if the projects are well designed, the instructions are clearly written, and the teachers are willing to be a guide on the side rather than a sage on a stage. All history courses should be focused on research, not just the senior capstone. We just need to be more creative in how we engage students in research, and we need to be more transparent with our students and ourselves about our requirements and expectations. I hope the University of Arizona Enhanced Experience for *Age of Empires IV* demonstrates how historical thinking can be both meaningful and playful. Playful historical teaching and research can be far more engaging, exciting, and effective.

To learn more, visit https://bit.ly/AofEIV. ■

PAUL MILLIMAN (milliman@arizona.edu) got his PhD in History from Cornell in 2007, the same year he started teaching at the University of Arizona. His research and teaching focus on games and food, and he tries to make his research as playful as his teaching. He just published an article analyzing an anecdote from a papal letter asking whether a Polish duke was seriously not going on crusade in the Mediterranean because he could not drink his native beer and mead there. He recently started archery and will soon take lessons on falconry and historical fencing to better understand medieval hands-on history.

How to Train the People Who Keep Our Industrial World Running

By Lene Thirup

Unleashing the potential of virtual reality will revolutionize traditional hands-on training in complex industries.

We know that many of the societal challenges we are facing today will have to be solved by sustainable technologies and innovations in our complex industries. However, within the renewable energy sector alone we need to employ 26 million more people by 2030 if we are to reach the ambition to limit the global warming to 1.5 degrees Celsius.[1]

The question is who will install, maintain, and repair all the industrial solutions, we rely on — and how will we effectively handle the need for training these millions of people? After all, it is expensive to have employees travel thousands of kilometers for onsite training, particularly when classroom learning methods have limited output.

In this context, virtual learning environments and hands-on training with virtual reality (VR) offer industrial companies an opportunity to train and educate their employees in a more efficient, cost reductive, and environmentally sustainable way. Indeed, industry leaders in the maritime, renewable energy, and health sectors are adopting VR as a substitute for traditional learning methods with impressive results.

Virtual learning environments and hands-on training with virtual reality (VR) offer industrial companies an opportunity to train and educate their employees in a more efficient, cost reductive, and environmentally sustainable way.

While it may look like fun and games, VR training offers opportunities for collaborative, hands-on experiences that build camaraderie and provide the detailed on-the-job training needed in complex industries.

Outdated Learning Methods

There have only been a few changes in training over the last 100 years. To a wide extent, training

in industrial companies is still primarily based on classroom learning and expensive replicas. An instructor lectures trainees and hopes that they are listening and will benefit from the single-user experience. But lectures have limited success in building real-world knowledge of complex procedures.

In comparison, hands-on training onsite delivers better engagement than classroom learning. However, often it comes with a high cost involving travel and access to specialized training centers for familiarization, hands-on practice, and repetition for effective retention of knowledge.

For the past ten years, the Danish software company Kanda has specialized in using virtual reality and augmented reality in educational contexts. Today, they have developed a virtual reality training platform with the objective to educate employees in complex procedures, with a particular focus on the maritime, renewable energy and healthcare sectors.

Is VR effective for Training?

For decades it was unclear how to measure and document the use of VR in the educational process for the needs of modern industries. Recently, several studies have applied comprehensive methodologies that analyze the design, creation, implementation, and evaluation of individual courses implemented in a VR environment to identify significant advantages and disadvantages.[2]

Table 1. Advantages and disadvantages of using VR technology in education.

Advantages	Disadvantages
It enables creating complex test scenarios, experiments, and experiments that are difficult to implement in a real-world setting.	Costs are associated with creating an appropriate educational station using VR technology based on professional hardware and software.
Enables one to gain confidence in implementing technical procedures and activities	Requires a lot of work to create a virtual environment with many test scenarios and details
Allows for multiple repetition of experiences, experiments, or situations	Limited scope or lack of ready-made teaching scenarios
Saves money and time associated with setting up actual test stations	No real consequences for mistakes and errors made
Allows to perform exercises at any place and time	The ability to make users addicted to the virtual world
Ensures scalability of educational activities	Limits interpersonal contacts and experiences
Reduces consumption of resources	High probability of acquiring routine in the actions taken
Ensures safety of operations	Potential for health problems for users
Has the ability to adapt and apply to various fields and areas of education[2]	The possibility of ignoring basic laws of physics
Increases the ability to communicate and collaborate with people in remote locations	It reproduces better or worse than the given reality but is not able to replace it entirely.

Many of these documented advantages of using VR technology in educational context are included in the Virtual Training Platform that Kanda has developed.

Spacing Lessons Out Increases Long-Term Learning

An important aspect of virtual training is the possibility for employees to take their time, learn at their own pace, and repeat the training as many times as necessary

Traditionally, training is frontloaded when employees start; they are exposed to intense amounts of learning in a short period of time. Because of the high cost of on-site training, they rarely have enough time to build familiarity and practice their new skills.

A virtual training platform allows trainees to see, talk, and work together as a team, no matter where in the world they are. They can learn what they need to know in an environment that supports exploration and failure, improving long-term knowledge retention. They can review the material at their leisure to refresh their memory, and easily re-certify as needed.[3]

Designing Content for Hands-On Training

Yet another advantage of virtual reality as a training tool is that it ensures safety of operations and allows organizations to create complex test scenarios and experiments that are difficult to implement in a real-world setting.

The instructional design of the training content may include dramatic effects and simulated dangerous situations due to failures or mismanagement of procedures that would not be possible in real life.

In one example, a large shipping company wanted to establish green, technology-driven growth towards becoming the preferred transport provider in the shipping industry. VR training is one of the key elements towards that goal. A specially created VR training course has been used to train and certify over 200 crew members on a complete 3D-rendered virtual ship. The main element in the course is to train the complex procedures around handling liquefied natural gas (LNG), which the company often transports. It is a risky process, and thus it is pivotal that all employees are familiar with these procedures when they enter the ship in real life.

With each avatar, the trainees work together to solve different tasks and get used to how the

collaboration works in the different procedures on the ship. But they also learn what not to do.

An error in the procedures can result in the pumping equipment exploding with such dramatic effects that trainees will not forget that the error could in fact have had fatal consequences in real life.

When this happens, the participants will start all over again with the review of the training material and making sure that everyone will be able to handle the procedures with LNG correctly. For the maritime industry, this translates into safer and more accessible training for seafarers and other maritime personnel. This high-stakes training can be approached in a way that's immersive and engaging, yet still shows the serious consequences of errors.

Collaboration is key

Virtual learning environments also promote team collaboration without the need for physical travel to the same location or risk of virus transmissions considering the ongoing pandemic.

Virtual training platforms allow up to 15 colleagues to communicate and collaborate on the complex procedures while being physically situated in different parts of the world. The social aspect is one of the reasons why VR technology is so groundbreaking in this area. Participating in a training session requires nothing more than a pair of VR glasses, a laptop, or a tablet, yet it brings familiarity with both teammates and procedures.

The future of certified training will be digital

VR training can be so detailed and precise that there is no legal difference between the certificates obtained from Kanda VR training and those that come with a physical training with an instructor. The virtual simulated training can be certified to the same industrial standards as traditional physical simulations.

From a learning perspective, virtual training has a huge potential — either as a supplement to classroom training or a complete substitution of physical onsite learning facilities. With accelerated adoption due to the pandemic, it is expected that up to 50 percent of the market can be replaced by digital solutions.

In 2023 Kanda expects to be able to present a "low-code" function on the virtual training platform, which allows customers to design their own training courses and thus introducing even more tailormade learning environments to fulfill specific objectives.

Based on the business case and the documented scientific advantages of using VR technology in education, Kanda plans to continually evolve education and training through immersive digital simulation methods and expand to several other industries.

VR: Environmentally Friendlier and More Cost-Effective

Onsite training for heavy industries is both financially and environmentally costly. By replicating training sites in VR, it is possible to reduce the manufacturing and energy costs associated with building, maintaining, and upgrading training equipment. A VR training platform can reduce the environmental impacts of trainee travel.

Looking into the current key results based on client calculations, the business case looks very promising in terms of moving from onsite to virtual training.

Based on our clients calculations
Virtual Training Key Results
of moving from on-site simulators to Kanda
On average
500 Kg
CO2e reduction per trainee
By not having to travel anywhere but the usual office space to conduct training.
Up to
75%
Cost decrease on training
Comprises of ressources, classroom and flight tickets, and this is even excluding salaries.
Usually
6-9 Months
Return on Investment of development
Based on the reduced cost of delivering and participating in the training.

Virtual training is also cost effective. In addition to reducing the expenses for travel and accommodation for training, they can potentially save millions in asset maintenance previously spent to develop custom-built training sites.

The VR Opportunity

The future for immersive and human-centered digital learning looks strong. We have already seen in Paul Milliman's article on page 16 that gamification principles can enhance learning. By leveraging VR technology and the engagement that we find in games, it's possible to develop immersive and human-centered digital learning applications that enable collaborative teamwork from anywhere on the planet. ■

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Content That Speaks for Itself: Facilitating Learning in the Virtual Classroom

By John Clement | STC Student Member

The best classes actively engage students in the learning process. Online content brings challenges, but also opportunities for accessible, engaging learning.

Online learning and online instructing is difficult. As compared to an in-person classroom, the virtual classroom strips away many of the things that typically facilitate learning — a physically present instructor for one, and a setting where you are surrounded by peers. Taking both away oftentimes forces the content of the class itself to shine. In a situation such as this, it is essential for instructions, lecture materials, and course structure to be well-designed, accessible, and engaging if sufficient learning is to continue — and, among students, for it to feel worthwhile.

It is essential for instructions, lecture materials, and course structure to be well-designed, accessible, and engaging if sufficient learning is to continue — and, among students, for it to feel worthwhile.

Instructional Design in the Virtual Classroom

The goal of all classes is to teach students the skills they need in order to excel in a specific field or area of expertise. The best classes, though, are set up in a way that does not simply pull students along for the ride; they actively engage students throughout the process. A shared principle between instructional design and technical communication is that content must be presented effectively. In the classroom, principles of good instructional design must guide the course's content for the benefit of all students and learners participating.

In a typical classroom, instructional material and information may be facilitated by items such as handouts, videos shown during class, slides shown during lectures, and potentially an online platform that acts as a repository for the course's resources. In the virtual classroom, some of these elements may stay the same, but many change. In some setups, the slides may replace the physical instructor. Images and videos become a core facet of learning. The online course page becomes less of a repository and more of a home for the entire course. Important considerations must be made.

During my time as a university student, approximately two of my four years of my undergraduate degree were online. The transition startled everyone, notably instructors. Students — including myself — were left at the mercy of our professors' capability to transfer their instructional design skills to the virtual landscape. Notice how I say instructional design skills instead of just technical skills. I have had courses where the design of their online course pages was nothing I would call extravagant, but it was organized in a way that was engaging and facilitated learning. On the other hand, I have had courses where all the bells and whistles available on their website were put to use. However, it was done in a way that constrained the learning process and made navigation difficult — virtually, on the webpage itself, and mentally, through trying to remember where each piece of knowledge lived. Students have discovered that the strength of an instructor's design principles are what can make or break a course for its students.

Instructional design is vital to creating an effective learning environment. That said, what are some of the specific shapes a virtual class tends to take, what challenges come with each, and what considerations should you make when designing your own instructional material?

The Wild West of Online Learning

The "where" of a course is just as important as the "what" that is its content. Virtual classrooms must make considerations that come with lacking physical presence, but being online can take multiple different shapes. Which model your course or material fits into, or which one you choose, can and should guide the rest of the content design and teaching process. Each method has a different primary method by which content can be taught.

1. **Fully online (asynchronous)**: This is the completely distant model of learning. There is no setting to meet with others face to face, including over video. Here, content is king, and self-drive is paramount. Challenges can arise for students if the online instructor is

either not frequently communicative or the online course is structured poorly.

2. **Live lectures**: These are the most similar to in-person classes. When lectures still get to be taught live and students have incentive to log in at a regular time, the feeling in-person learning is emulated to a degree. Challenges arise without the classroom setting itself; there is less peer interaction, and it is harder to "walk" up to the professor before or after class for a question — which can be a quick but meaningful interaction.
3. **Hybrid**: This option often takes the shape of an in-person class occurring as usual but with an online Zoom-in option. While the versatility is beneficial, it is challenging to not alienate the online students. Just because in-person teaching is available in this scenario, it does not mean that the segment of students experiencing the online variant of the class should be subject to content with poor instructional design. Additionally, interaction with online students can easily be put to the wayside over in-person students.

As an instructor, the platform that class is being taught through and the means by which students are accessing your content are each pieces of the puzzle to consider. You must ask yourself these essential questions when designing online course content: How can I make sure my content best serves those receiving it? How can I make sure it is engaging and accessible? How can I make sure my content can stand on its own two feet and continues to facilitate learning after the handoff is done?

Advice on Making the Best Online Content

There are multiple ways to make the most of an online class environment. As I mentioned previously, learning is not improved primarily by how many or which tools you make use of (though it certainly helps). The intention behind how you use each tool, tie it into the goals of the course, and use your own method of instruction make all the difference. Below are five different tips related to instructional design, which you should keep in mind when designing instructions, training, and course content.

1. **Establish clear objectives.** This includes both long-term objectives, such as what students can expect to learn by the end of the course, and short-term objectives, such as what the goal and tasks for each week or module are. A good syllabus or course introduction helps with this, and frequent reminders double down on that. The weight students can face in online courses can be overbearing, especially if they must do some self-teaching; these added benchmarks can help lighten that load and provide clarity on the directions they should take.

How can I make sure my content best serves those receiving it? How can I make sure it is engaging and accessible?

2. **Structure your course well.** An online course where all the resources, notes, and materials are lumped onto a single page or module can do more harm than good. The same goes for a course which has too many different tabs, modules, and links redirecting to various places. Refer back to your objectives for the course and look from the lens of the learner. What content is most important? Give that priority and emphasize it early on your course page or menu. What resources will students likely access most often? Give that similar treatment and consider placing related items under the same category. Make sure that someone looking at your content for the first time can easily find where they need to go and the structure answers the questions they enter with — even if that question is, "I have five minutes before my exam and I haven't studied yet. Where is that study guide?" Your considerations might same some academic lives.
3. **Make your content engaging, appealing, and accessible.** In doing so, consider what tools you'll need for the job. Images, diagrams, text, video, presentation slides, multimedia and interactive content — each supply a specific need and have situations where they work best. If you have a lot of information you want to teach and want to make it easier to remember, consider representing it visually, reinforcing the content with, or turning it into, images or

video. If you have data, use charts. For locations, use maps. Split content that could be on one long page into multiple pages with their own distinct purpose. Good design can enhance and curate your instructional content. In doing so, remember to make it accessible. When possible, supply text, visuals, and possibly audio as well. For many students it will reinforce the knowledge, and for some, it will be a critical way of them receiving it in the easiest way possible. Give your content far reach and make it look good while doing it. You never know who your considerations might be able to help.

4. **Encourage group collaboration when possible.** One drawback of online learning is the difficulty of mimicking the classroom environment, which often includes group collaboration or discussion. In this case, intentionality is key. It is one thing to offer a live lecture and read slides from a PowerPoint, but what major good does that do over a video recording or solely slides? Create spaces for students to ask questions. Use tools such as Zoom's breakout rooms to make areas where students can discuss in a smaller group size. One reason students may be less inclined to participate while online is because of the vulnerability required when speaking up on a call. With asynchronous classes, look into creating asynchronous places for you and students to communicate. Discord, GroupMe, and Slack are all options that create spaces for engagement. Working with and hearing from others only increases the retention of content and instructions. They reinforce it with memorable moments and provide areas for questions to be asked and answered.
5. **Communicate, communicate, communicate.** What are technical communicators if not people who understand the value of just that? While your content should be able to speak for itself through good structure and high quality, nothing beats hearing from the instructor themselves. Be present however possible. Provide your contact information, set up times when you're available to talk, make announcements, and post reminders once in a while. It all goes a long way. On top of all that, too, ask for feedback. You don't know what you don't know. Communication is a two-way street, and through the vulnerability of asking for feedback on how you are teaching your content, you may find ways to improve and aid your students in ways that you never would have thought of. Every student and group is different, so it will help you to accommodate for individual needs and learning styles.

Good content is nothing without good design. The key to succeeding in making effective content, especially for the virtual classroom, is to create it with your audience in mind. Understand which content they need and where they would be able to find it easiest. Appeal to as many learning styles as you can and reinforce your information with media. Above all, make sure the structure of your content is solid, the place where it lives is navigable in a way that makes sense to students, and it reinforces the goals of the learning. Online classes are here to stay, but for all the challenges that may arise from them, they also make room for opportunity. The best and most curated content tends to be that made under restraints. Oh, and please keep that study guide in an easy-to-find place. Your students will thank you. ■

> **Good content is nothing without good design.**

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Five Tips from Lupin: What A Harry Potter Professor Teaches Us About Instructional Design

Jamye Sagan | STC Associate Fellow

Channel your inner wizarding professor to develop clear and effective lessons.

As technical communicators, we stand ready to tackle any project we receive, including developing training materials and programs, even if we had never formally studied instructional design. Education plays a crucial role in the *Harry Potter* series by J.K. Rowling. At Hogwarts, where Harry Potter and his friends study magic, we witness several examples of instruction in action. Each professor — whether terrible or terrific — has important lessons to share with us regarding effective instructional design and training delivery. One particular professor embodies elements of excellent instruction — Remus Lupin, the Defense Against the Dark Arts teacher during Harry's third year at Hogwarts. With his patient and encouraging manner, Lupin successfully teaches his students how to defeat evil creatures.

Let's peek into Professor Lupin's classroom to learn five tips for designing effective instruction for our learners.

Background: Lupin's Class

Lupin teaches his students how to fight boggarts, creatures that physically embody one's deepest fear. In teaching his class this complex charm, he breaks the process into manageable components to ensure his students completely understand what they need to do.

First, Lupin introduces the lesson with several leading questions to gauge what the class already knows about boggarts. After establishing that knowledge base, he then has the class practice saying the charm aloud. Once the students can chant the incantation properly, Lupin invites a student to help him demonstrate the entire spell. Lupin guides his student through the process of making his greatest fear look comical –the expected outcome of the spell and the lesson. With Lupin's encouragement, the student performs the charm successfully. Finally, Lupin invites the rest of the class to practice the charm, offering feedback to ensure students perform the spell correctly.

Tip #1: Define Learning Objectives

After receiving an instructional design request, one of the first and most important actions to take is defining learning objectives. What do learners NEED to know and do after receiving training? Learning objectives serve as the major driving force behind the entire course development cycle.

When differentiating between essential and optional information, consider the Pareto principle: what will folks spend 80 percent of their time doing? Focus these energies on that 80 percent. Once you determine what the learners need to know, you can begin crafting your learning objectives. Cut all "nice to know" information from the training; you can always provide this optional information as reference material elsewhere. Having clear-cut goals and objectives will help you keep the training on track since you have already defined what you want your learners to know.

Learning objectives must be specific, measurable, and tangible – that they can be seen, felt, or heard. How can you create solid learning objectives? In his book *Preparing Instructional Objectives*, Robert Mager proposes three questions to ask:

1. What is the desired outcome? In other words, what behavior needs to happen?
2. Under what conditions must the action take place to achieve the desired outcome?
3. What is considered success? That you perform correctly X percent of the time, or can do it at least?

When crafting learning objectives, use verbs that describe a specific action. Refer to Bloom's Taxonomy for examples of measurable verbs to use.

Lupin embodies this tip when designing his boggart lesson. Before even launching into the practical portion of his lesson, he explained what boggarts are, where they came from, and what they looked like so students could properly identify them and use the correct spell.

Tip #2: Chunk Content into Manageable Pieces

Once you define what your learners need to know, you can begin gathering content. As you gather and curate content, chunk it. Chunking content means breaking it into smaller pieces and later rearranging these pieces into logical units. Doing so makes information easier to digest. No matter the training format (e.g., e-learning or

instructor-led), break up the content into several related modules.

> **As you gather and curate content, chunk it into smaller pieces that can be rearranged into logical units.**

Chunking information ensures you present only the information covered in the learning objectives. Chunking training content also simplifies course updates; you only have to update the small chunk versus the entire course. Besides. if you present too much information to your learners at once, they may get overwhelmed and start tuning out information — cognitive overload. A good rule of thumb is scheduling no more than 15 minutes per module or activity.

Lupin demonstrates this tip by how he breaks down his entire lesson into smaller segments. He gauges his students' prior knowledge about boggarts. Then he has them practice saying the incantation. After that, he leads a guided demonstration of the spell with a student before allowing the rest of the class to practice. Lesson chunking ensured the students could perform this spell successfully.

Tip #3: Craft Content with Sensory Appeal

Now that you have organized your content into manageable chunks, you can now format that content accordingly. When possible, show rather than tell. Incorporate a variety of activities and into your lesson.

While lectures are effective for conveying information, they quickly lose impact if they don't engage as many senses as possible. Include such elements as images, video clips, graphs, charts, and other audio/visual elements. Better yet, don't depend solely on lectures to convey information. Include group discussions, exercises, and other activities that invite participation. Use multimedia elements to make your lessons come to life.

Lupin embodies this tip with his guided demo of the spell. The students hear Lupin explain the steps and the expected outcomes. When Lupin has Neville identify his greatest fear (Professor Snape) and mentally picture something that would make Snape look odd (ostentatious vulture hat), the students see the spell in action. The boggart takes the shape of Snape. As Neville performs the spell, boggart-Snape now wears the vulture hat and no longer poses a threat.

Three Quick Thoughts

- Consider how procedural steps are broken down
- Think how similar topics can be grouped together
- Break down larger objectives into smaller ones

Considerations for Choosing Multimedia Elements

- **Which trait do you want to showcase?** Think about which multimedia element would best convey your message. For example, if you want to demonstrate how to apply a blood pressure cuff, then a brief video showing the process would be ideal. However, if you do not have video capabilities, then use a series of photos to show key elements such as where on the arm to place the cuff.
- **In what format will your learners view your materials?** Will they view your training via webinar or video? If so, you can certainly incorporate video. Otherwise, if you are using only printed materials, then use photos. In any case, make sure your learners can view the desired output with the tools they have.

Tip #4: Establish a Risk-Free Environment for Practice

When needed, give learners a chance to practice their skills in a risk-free environment. Examples include pre-developed scenarios and software demonstrations, like those shown in Lene Thirup's article, "Train the People Who Keep Our Industrial World Running," on page 21.

When developing practice scenarios or hands-on training, focus on the most important and/or complex topics first. How can learners practice

what they have just learned? For instance, in e-learning courses, create software simulations or branching scenarios. For instructor-led sessions, set up a testing environment with pre-defined exercises and scenarios. All practice activities MUST align with learning objectives. Otherwise, they are simply a waste of time and do not effectively convey what your learners need to know. Setting up practice opportunities may take extra time in advance but are well worth the effort.

Lupin sets us his practice environment by searching the castle for a boggart, which he then stores in the class cabinet until the class begins. The boggart can easily assume different shapes. Plus, during the group practice session, Lupin abruptly stops the lesson when Harry begins his practice session. Lupin did so to prevent the boggart-Voldemort from appearing. Although Harry later revealed that Voldemort was not his greatest fear, Lupin still took the correct action in preventing any potential pandemonium from breaking out.

Tip #5: Give Effective Feedback

Finally, as you deliver your training materials and witness your learners in action, giving feedback not only provides encouragement but also helps in skills development. Whether given verbally or written, feedback must be specific to be most effective. Instead of murmuring "Good job!" or shouting "Wrong!" give a reason and explain why. For example, when developing e-learning courses, I incorporate several "Test Your Knowledge" questions throughout the course. I base these questions on the defined objectives and provide specific feedback. When the learner answered the question, they would immediately know if they answered correctly or not, and more importantly, why. Meaningful feedback helps learners validate their strengths and identify areas of opportunity.

Lupin demonstrates this tip by observing the class and offering feedback to make sure they perform the spell correctly. Also, when another teacher makes fun of Neville's abilities, Lupin expresses his confidence in Neville's future performance.

Conclusion

Through his lesson in defeating boggarts, Professor Lupin demonstrates effective instruction and solid instructional design. First, Lupin determines his learning objectives and sticks with them throughout the lesson. Second, he organizes his lesson into several different parts so the students can learn about boggarts and effectively practice the spell. Third, Lupin uses a variety of activities to keep the students' interest, from a Q&A session to practicing saying the spell aloud. Fourth, Lupin establishes a risk-free environment to allow his students to practice the spell. Finally, Lupin offers feedback to ensure students perform the spell correctly.

Through his lesson in defeating boggarts, Professor Lupin demonstrates effective instruction and solid instructional design.

From asking questions to gauge what the class already knows about boggarts, to demonstrating the spell bit by bit, to having the class take turns practicing the spell, Lupin clearly embodies how effective instructional design can help learners achieve their goals. We can apply these lessons to our own practice, even if we are not experienced training developers. ■

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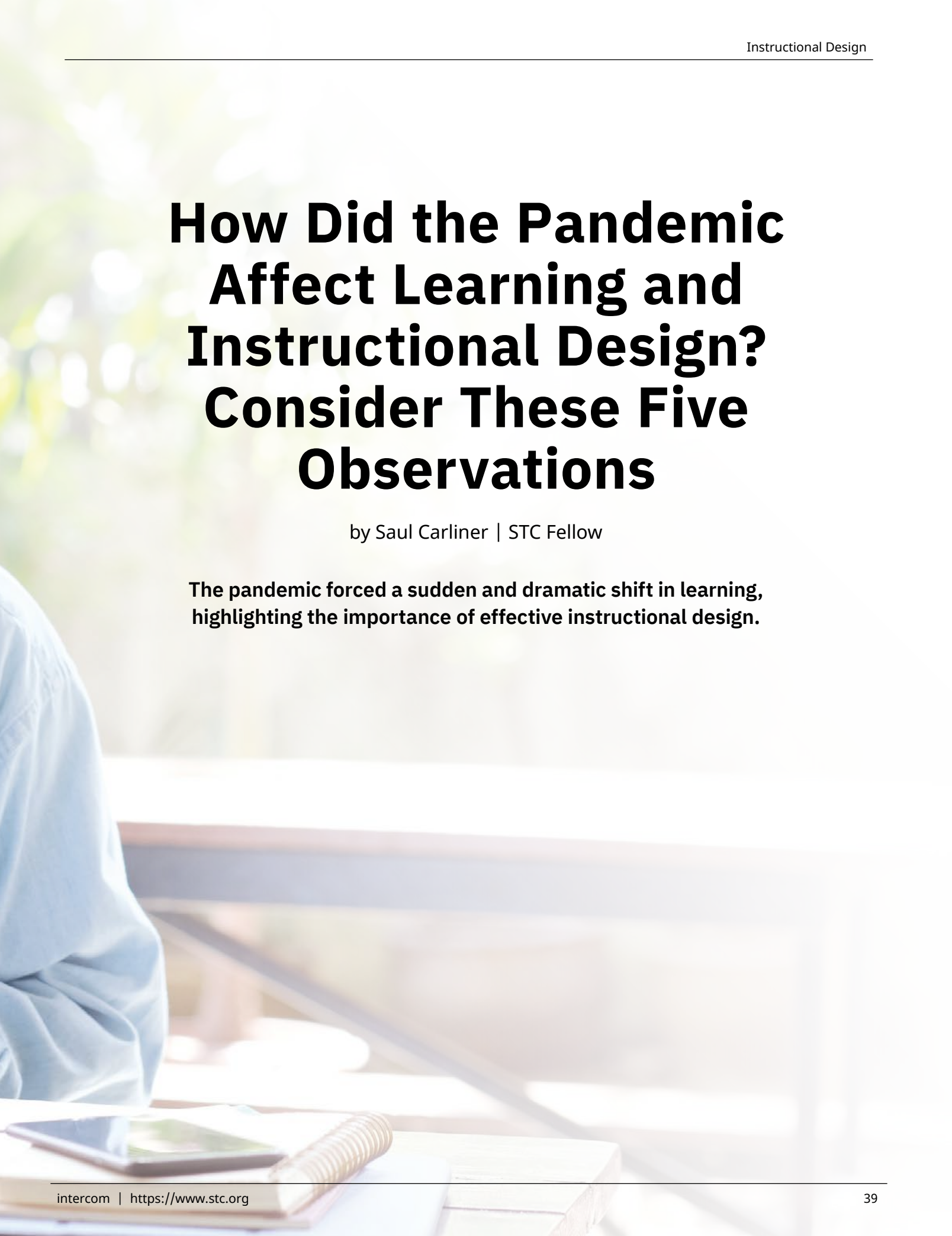
How Did the Pandemic Affect Learning and Instructional Design? Consider These Five Observations

by Saul Carliner | STC Fellow

The pandemic forced a sudden and dramatic shift in learning, highlighting the importance of effective instructional design.



One of the major stories of the COVID-19 pandemic is the virtual move that it spawned. Work, religious services, community events, city council meetings, exercise classes, and even STC conferences: they all moved online.

So did most higher education courses and workplace learning activities, and, in doing so, affected the instructional designers who prepare these courses and activities. To be fair, instructional designers have been preparing online instruction since the 1970s (yes, you read that correctly), with growing frequency since the dot-com era in the late 1990s and early 2000s, but never anything close to 100 percent of all higher education and workplace learning since March 2020.

So two years into this pandemic, the question arises about how this move online affected instructional designers. More specifically: What happened? Why did it happen? And where does it leave us?

> **How did the move online affect instructional designers? What happened? Why? And where does it leave us?**

This article shares five observations about the impact of COVID-19 on instructional design in higher education and workplace learning: observations about the readiness of different education sectors to move online; how the move online showed gaps in our understanding about the limits of online instruction; about the demand for instructional designers; about changes to instructional design services; and about learners' reactions to online learning, which ranged from enthusiastic to revulsed.

Observation #1. Some sectors of education were better prepared than others for the transition to remote teaching

When the World Health Organization declared a pandemic in mid-March 2020, many work and learning activities continued remotely using an existing technology infrastructure. Just as some employers were better positioned for remote work than others, some sectors of education were better prepared than others for the transition for remote teaching.

Higher education and many continuing and professional education groups had been slowly but steadily strengthening their online teaching presence. In fact, despite a downward trend overall in undergraduate enrollments in higher education, online learning was growing in double-digit percentages in the years leading up to the pandemic. Most institutions also supported in-person classes with online resources, including posting materials and resources on course or learning management systems and facilitating meetings with virtual meeting software (like Zoom). As an example, STC has offered online certificates for well over a decade.

> **Despite a downward trend overall in undergraduate enrollments in higher education, online learning was growing in double-digit percentages in the years leading up to the pandemic**

Similarly, nearly half of all workplace learning has been online since the late 2000s, although most of that was in the form of self-study e-learning (up from less than 10 percent at the turn of the millennium). Employers weren't anticipating a pandemic; they merely sought a more efficient and cost-effective way of training workers.

By contrast, pre-K and K-12 were never designed for extensive online learning (except for students who were out on medical leave or live in remote areas); these groups had limited technology

infrastructures and few instructional materials. More significantly, a large percentage of students had either no access to the Internet, lacked a device with which to connect to the Internet, or both.

Observation #2. The transition highlighted gaps in the understanding of online learning

On the one hand, a half-century of research on technology-based learning had established that online learning is just as effective as classroom learning and those findings held true across all sectors of education (pre-K, K-12, higher education, workplace learning, continuing and professional education, and lifelong learning).

On the other hand, three issues arose that educational technology specialists had previously overlooked or downplayed. The first is that the research merely found that learning under the two conditions was about the same. It never said that the courses under study were well designed, meaning that if the classroom version of the course was lousy, the online version would be similarly lousy.

> **While research showed that online learning was as effective as classroom learning, it never said that the classes were well designed. If the classroom version was lousy, the online version would be equally ineffective.**

The second issue is that the research only looked at whether online learning could be as effective as classroom learning. It rarely considered the unique affordances of in-person teaching at different levels and the roles those play in a "complete" education. For example, children learning at home require adult supervision, which has an effect on parents. Certain vocational education programs require hands-on sessions that cannot be replicated online, such as training to drive big rigs and most construction trades. Similarly, one of the unique advantages of a top-rated in-person MBA program is the one-of-a-kind networking opportunities it offers. Although networking virtually is feasible, students do not perceive it has similar value as the in-person approach.

Third, the move to remote teaching showcased most classroom instructors' lack of training in remote teaching. This posed a challenge for K-12 teachers, who receive extensive training and coaching on in-person teaching but also rely on materials designed for the medium of instruction (and nearly all K-12 materials at the start of the pandemic were designed for in-person use). This posed an even greater challenge for instructors in higher education, continuing and professional education, and lifelong learning, and for some workplace learning instructors, most of whom receive little to no training in how to teach, much less how to teach in a student-centered way, which is central to effective online teaching.

Observation #3. After initial layoffs, demand for instructional designers skyrocketed

In the first days of lockdown, instructional designers — like so many other workers — received layoff notices. This especially affected the program in which I teach because the capstone for most of our students is a four-and-a-half-month instructional design internship. Most work locally and because one of the major industries in Montreal is the aerospace industry, when air travel ground to a near halt, so did the internships. In fact, several students who were supposed to start internships in late April and early May 2020 learned that the companies cancelled them.

By mid-May, however, we had as many as three opportunities for each seeking an internship. Nearly all of the demand came from higher education institutions seeking workers to help instructors shift their courses online for the fall 2020 term. Many employers initially contacted us to hire workers; we asked them to consider interns.

The short-term good news indicated some key shifts, however. One is a shift from training departments in companies or in service providers to the e-learning and faculty development units of higher and continuing

education groups. (Faculty development groups provide ongoing training and consultation to instructors of in-person classes; e-learning units typically develop self-study online courses.) The other major shift observed is that nearly all of the work was contract or short-term. Many instructional designers in higher education were hired as contract workers prior to the pandemic, but this distinction was even more pronounced during the pandemic.

Observation #4. Some universities and training departments moved beyond one-size-fits-all services in instructional design

Before the pandemic, most e-learning groups in higher education designed and developed self-study e-learning courses, usually from materials used by instructors in in-person classes. They provided a complete service — from needs assessment to administering the completing course. The service was thorough but also slow — about a year from start to finish, often longer.

The pandemic changed two things. First, "online" no longer just meant self-study. Courses could be offered using the Live Virtual Classroom (aka Zoom). Second, no one had time. So the e-learning units in some higher education institutions began offering a slimmed down service, which would could complete the conversion of a course to an online format in a matter of months or weeks. Some of the reduction of time resulted from the use of live virtual teaching, which reduces development time from the 79 hours of effort for 1 finished hour of self-study instruction to 40 to 60 hours of effort for 1 finished hour of live virtual instruction. Analysis primarily consisted of the instructional designer familiarizing themselves with the course content and structure, rather than learning it in-depth. Design involved revising rather than rewriting course objectives and assessments, and the adaptation of existing activities to an online format rather than completely redesigning those activities. Some of the quality checks needed for self-study e-learning were not necessary for live virtual teaching.

The pandemic changed two things. First, "online" no longer meant self-study. Second, no one had time to prepare and convert classroom learning to online formats because of the nature of the sudden shift.

In addition, many institutions supported a further slimmed-down do-it-yourself (DIY) approach, in which instructors could attend an expanded selection of workshops on teaching to build their repertoire of skills in remote teaching. The number of full-time instructors attending these workshops grew extensively as instructors recognized that they lacked training for remote teaching. Faculty development groups also used this opportunity to raise awareness of student-centered teaching techniques and Universal Design for Learning (UDL) — which not only seeks to make courses accessible to students with disabilities, but also inclusive to all students.

Workplace training departments expanded their offerings to include producing live virtual training in addition to self-study e-learning, and boosted their collaborations with providers of libraries of online learning programs. Large providers like Coursera, edX, and LinkedIn Learning not only provided immediate skills training like advanced Excel and negotiation skills, but in-depth preparation for long-term skills shifts, like coding schools and analytics training.

Observation #5. Different groups of students reacted differently to learning online

Despite the exceptional growth in online learning in the past two decades, many people still had limited experience with it before the first lockdowns.

No more.

To the disappointment of some instructional designers, the reviews were mixed. In general, the majority of K-12 students and their parents continue to prefer in-person over online learning. Some of the preference arises from practical

issues: the need for adult supervision of children studying online that also affects parents' abilities to work, the lack of physical activity, and the lack of social interaction and development, all exacerbated by the challenges with connecting to the Internet, finding devices to use, and the limited educational materials. Educational technology researcher Neil Selwyn once observed that, despite the many issues that people have with schools, they also have some desirable traits. The pandemic highlighted those.

Similarly, most traditional undergraduate and some full-time graduate students prefer in-person teaching. Some of it was the classroom experience but some of what these students seek is the on-campus experience. By contrast, most mature undergraduates and part-time graduate students, and some full-time graduate students seem to prefer remote teaching. Most of them have jobs and family responsibilities and the convenience of learning anywhere saves hours in commuting to campus.

The reaction among workplace learning, continuing and professional education, and lifelong learning students is harder to gauge. The move to online learning long preceded the pandemic; the pandemic merely forced the remaining programs online. The one exception was conferences, only a few providers offered online conferences before the pandemic. (The Learning Guild is one of them.) At the height of the pandemic, conferences moved online but some conferences immediately moved to a hybrid in-person and live virtual format as soon as possible. Those that tried to move completely back to in-person settings experienced reduced attendance and high cancellations when COVID waves rose. But the desire to meet in person continues despite the growing viability of online events.

So, What's Next?

If the pandemic transitions into an endemic (that is, we learn to live with COVID in our communities) and in-person activities resume, the question arises about how the extent to which online learning remains a part of the higher education and workplace learning ecosystem.

Although I cannot predict with certainty the long-lasting impacts of the pandemic on learning in these two sectors, these observations described above offer insights into what could likely happen. Expectations for the availability of online learning resources have grown as has comfort in learning online, and opportunities for instructional designers appear to be strong as the pandemic shifts to an endemic. ■

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Developing Medical Device Instructions for Use to Facilitate Learning

By Terence Pyle

Instructions for use (IFUs) play an important role in the learning and mastery of complex medical devices and must be carefully designed to support clinical workflows.

As medical devices have become more interconnected and complex, new demands have been placed on clinical workers to develop and maintain mastery of various medical devices. Complex health technology requires clinical users to understand, configure, operate, and troubleshoot medical devices. Devices that are difficult to learn or use invite harm and legal liability.

Complex medical devices require effective instructions for use (IFUs) to develop user proficiency and consistent proper use. Well-developed IFUs can play a valuable role in teaching end users how to operate a medical device safely and effectively. Poorly designed IFUs can be misused or ignored by healthcare professionals.

Using a systematic approach to determine necessary content and to develop, deliver, evaluate, and validate the IFU, helps to create effective instructional materials. Included in this article are tips for writing and designing medical device IFUs that facilitate learning. These recommendations cover both content and format. They include:

- Understanding the target audience
- Task analysis
- Developing content
- Writing warnings
- Testing the manual

Understanding the Target User

What information should be included in the IFU depends in part on who is using it and what level of knowledge they bring to the task. Identifying the characteristics of each user group is critical to creating an IFU that works for them. The primary users of the medical device might include a variety of healthcare professionals, such as physicians, nurses, and technicians.

Make sure to adjust the language to the relevant audience. If the users are physicians, consider using different language than if the medical device were intended to be used by technicians. Talking to people who use the medical device or devices is likely to determine general characteristics and context of use that could guide the best approach to writing instructions. What is their age? Are they elderly? Are they literate? At what reading level? Will the range of users understand the technical language used in the instructions? Will the user understand the circuit diagrams, tables, charts, and graphs used in the instructions?

Task Analysis

Task analysis is a collection of procedures for defining the content of an instructional unit. It defines the content necessary to solve a performance problem. During this process, the technical writer can view the content from the learner's perspective; understanding the learner's knowledge and background helps the technical writer determine the scope of the task analysis. The output of the task analysis is documentation of the content to be included in the IFU.

A procedural analysis is a specific type of task analysis for analyzing knowledge and tasks well suited for defining cognitive sequences involving a series of steps. It is conducted by walking through the steps with an SME and used to analyze tasks by identifying the steps required to complete them.

To do a task analysis, walk through the steps using the actual equipment, identifying and arranging all the steps necessary for performing the entire process required to use the medical device. Walk through the steps using the actual equipment. The information gathered from the walkthrough will be developed into the IFU.

> **To do a task analysis, use actual equipment and walk through all the steps necessary to perform the entire process**

Using Mental Models to Guide Content Development

A mental model is defined as the knowledge that the user has about how a system works, its component parts, the processes, their

interactions, and how one component influences another. Mental models are useful in learning, retrieving and problem solving. Several studies have empirically tested the benefits of a mental model provided when used in learning and operating a device. In one study, Kieras and Bovair found that people who learned a mental model showed improvements in learning, recall, and transfer over those who did not.[1] This study revealed that users having a mental model for the device improved performance on learning and retaining the operating procedures for a device.

Dick[2] describes how users develop mental models by observing what happens with a process and drawing conclusions about how the process works. To develop instructional content explaining how to use a medical device, we provide users with information they can use to mentally re-create the same mental model we have for the process. A user's ability to operate the device depends on how effectively the users can re-create and follow the mental model as described in the instructional content.

Mental models are a key concept in the development of user instructions. If we don't help users develop accurate mental models of how a medical device is installed, operated, and proper troubleshooting of problems then users are left on their own to develop their mental models. If the user's mental models are not correct, they may have problems setting up, configuring, and operating the device.

Developing the Content

Once the task analysis is complete, refine the instructions using appropriate language and graphics. As the instructions are refined, consider the user's knowledge and expected use environment, uncovered during user research.

The instructions should focus on how to operate the device. The user needs straightforward information about what to do, how to do it, and when to do it. Do not bury this important information in a lot of text. Assume that the user does not have device or medical knowledge.

Provide logically ordered steps for the task and make the user aware of the importance of doing the steps in order. State the purpose and the expected outcome of each task. Tell the user what steps are essential, and which are optional. The language used should be written at a sixth to seventh grade reading level to ensure clarity. Many people will not reread something they do not understand.

Installing the Device

Installation information provides step-by-step instructions for putting the device into service. Provide procedures for initial start-up and for verifying that all system components operate properly.

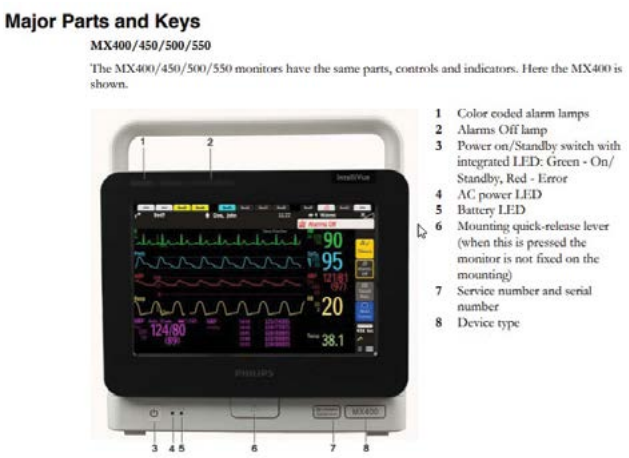
Must-Have Installation Instructions

- Unpacking the product, including a checklist of items included in the package
- Minimum space required for use, maintenance, and repair
- An interconnection diagram or table
- How to check whether the device is installed and ready to be operated safely

Devices may require a check-out procedure for safety and effectiveness, including visual inspection or calibration. Identify when the check-out should be done, such as at the time of setup or before each use. Also, include step-by-step instructions for checking proper function of necessary device components. Explain what to do if the check-out shows that the device is not working properly. Provide guidance on who to call if there is a problem. Refer users to the troubleshooting section in the manual if any problems can be resolved without manufacturer intervention.

Operating Instructions

Provide a brief physical description of the device, its parts, and any ancillary accessory items. Include a graphic of the device showing all parts of the device such as buttons and displays.



Major Parts and Keys

MX400/450/500/550

The MX400/450/500/550 monitors have the same parts, controls and indicators. Here the MX400 is shown.

1 Color coded alarm lamps
2 Alarms Off lamp
3 Power on/Standby switch with integrated LED: Green - On/ Standby, Red - Error
4 AC power LED
5 Battery LED
6 Mounting quick-release lever (when this is pressed the monitor is not fixed on the mounting)
7 Service number and serial number
8 Device type

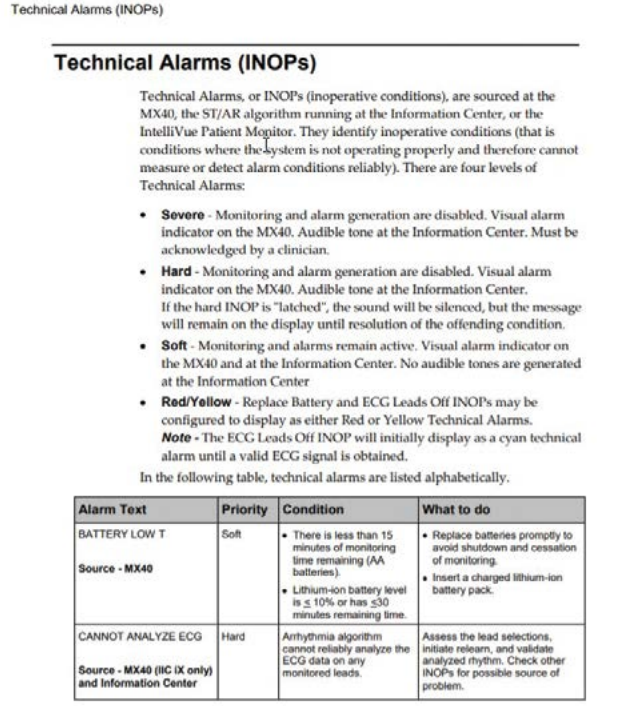
Figure 1. Major Parts and Keys (Source: Instructions for Use Philips IntelliVue Patient Monitor MX400/450/500/550/600/700/800)

Principles of operation provide conceptual information to enable the end user to perform tasks by understanding the purpose and the principles of operation of the device. Backinger[3] et al suggests including the following information in the operating instructions:

- Special preparation the user needs before operation, such as handwashing or device warm-up procedures
- Warnings or safety instructions specifically related to operation should be placed immediately before the corresponding task or instruction
- Expected results of the correct and incorrect operation
- Importance of following operating steps in logical order to obtain the expected results
- Space for user-specific instructions
- Instructions on who to call if there is a problem

Troubleshooting the Device

Anticipate the problems the device users might have with the setup, operation, or maintenance of the device. Clearly and briefly describe the symptom of each problem so the user can easily match the description to the problem observed. If the device displays error messages, list them and what they mean. Explain the steps necessary to correct the problem.



Technical Alarms (INOPs)

Technical Alarms (INOPs)

Technical Alarms, or INOPs (inoperative conditions), are sourced at the MX40, the ST/AR algorithm running at the Information Center, or the IntelliVue Patient Monitor. They identify inoperative conditions (that is conditions where the system is not operating properly and therefore cannot measure or detect alarm conditions reliably). There are four levels of Technical Alarms:

- **Severe** - Monitoring and alarm generation are disabled. Visual alarm indicator on the MX40. Audible tone at the Information Center. Must be acknowledged by a clinician.
- **Hard** - Monitoring and alarm generation are disabled. Visual alarm indicator on the MX40. Audible tone at the Information Center. If the hard INOP is "latched", the sound will be silenced, but the message will remain on the display until resolution of the offending condition.
- **Soft** - Monitoring and alarms remain active. Visual alarm indicator on the MX40 and at the Information Center. No audible tones are generated at the Information Center
- **Red/Yellow** - Replace Battery and ECG Leads Off INOPs may be configured to display as either Red or Yellow Technical Alarms. ***Note*** - The ECG Leads Off INOP will initially display as a cyan technical alarm until a valid ECG signal is obtained.

In the following table, technical alarms are listed alphabetically.

Alarm Text	Priority	Condition	What to do
BATTERY LOW T **Source - MX40**	Soft	• There is less than 15 minutes of monitoring time remaining (AA batteries). • Lithium-ion battery level is ≤ 10% or has ≤30 minutes remaining time.	• Replace batteries promptly to avoid shutdown and cessation of monitoring. • Insert a charged lithium-ion battery pack.
CANNOT ANALYZE ECG **Source - MX40 (IIC iX only) and Information Center**	Hard	Arrhythmia algorithm cannot reliably analyze the ECG data on any monitored leads.	Assess the lead selections, initiate relearn, and validate analyzed rhythm. Check other INOPs for possible source of problem.

Figure 2. Technical Alarms (INOPS) (Source: Instructions for Use Philips IntelliVue Patient Monitor MX400/450/500/550/600/700/800)

Do not confuse the reader with technical reasons for problems unless the reasons are important to the corrective action. If there are problems that users cannot or should not try to solve themselves, include warnings or cautions and tell them how to get help. Provide the user with guidance on how to report adverse incidents.

Written Warnings

Every IFU must identify all necessary warnings and precautions when using or preparing the device for use. Warnings and precautions identify harm or potential harm that can arise for the patient or end user because of device use and is rooted in risk assessment.

The ANSI Z535.6 standard[4] gives detailed information on definitions, purpose, content, format, and location related to IFU warnings and precautions. Appendix E of the standard states that "research shows that hazard alerts are most effective when integrated into the task information at the most relevant location."

A warning must clearly:

- Identify the nature and severity of the hazard
- Tell the user how to avoid the hazard
- Explain the consequences of not avoiding the hazard

General warnings and cautions provide critical information that should be heeded before using the device. Place all such warnings and cautions at the beginning of the manual where the user will see them right away.

A warning or caution that applies to a specific instruction or action should precede the instruction to which it applies. Researchers have found that a separate section combining all these types of warnings does not help the user avoid hazards unless these warnings are also included with the step in the instructions to which they apply. Include only warning information relevant to the upcoming procedural step.

IFU Outcome Measurements

Usability testing can help identify strengths and opportunities for improvement. Regulators consider IFUs to be part of the user interface of a medical device; they should be treated as an essential design element and tested in conjunction with usability tests of hardware and software components of a medical device.

It is important to conduct usability testing early and often. This way the effectiveness of the IFU is ensured and the guide is moving in the right direction. When performing usability testing for IFUs, there are several factors to consider. There are essentially three concepts that need to be evaluated as listed by Branaghan et al[5]:

- **Search**: Can people find and see the necessary information?
- **Comprehension**: Do people understand the information?
- **Application**: Do people perform the step appropriately?

Provide the IFU along with the medical device and direct the users to perform tasks. This approach will assess whether users spontaneously refer to the document and if the users find the document to be helpful.

Measures of successful outcomes include:

- Fewer errors with procedures
- Fewer accidental button presses
- Fewer incorrect modes selected

Conclusion

Complex medical devices for patient care places new demands on clinical users to understand, set up, operate, and troubleshoot both stand-alone medical devices and integrated systems. Using principles from instructional design, technical writers can develop medical device IFUs that help their users develop a good mental model to learn how a device functions, how to troubleshoot it, and how to use it safely. ■

TERENCE PYLE (pyleterence@gmail.com) is a senior technical writer at Comet Technologies where he collaborates with a group of Customer Quality engineers to write and edit process, procedures, and work instructions. He has worked in the field of technical communication for more than 30 years providing technical writing and editing services to manufacturers and system integrators of electronic systems. He earned his MS in Technical Communication from Colorado State University. Terence in his spare time enjoys researching his family history and meeting relatives at family reunions. He is a native Californian who has also lived in Colorado, Utah, and Wisconsin.

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Becoming An Instructional Designer

By Edel Pace | STC Student Member

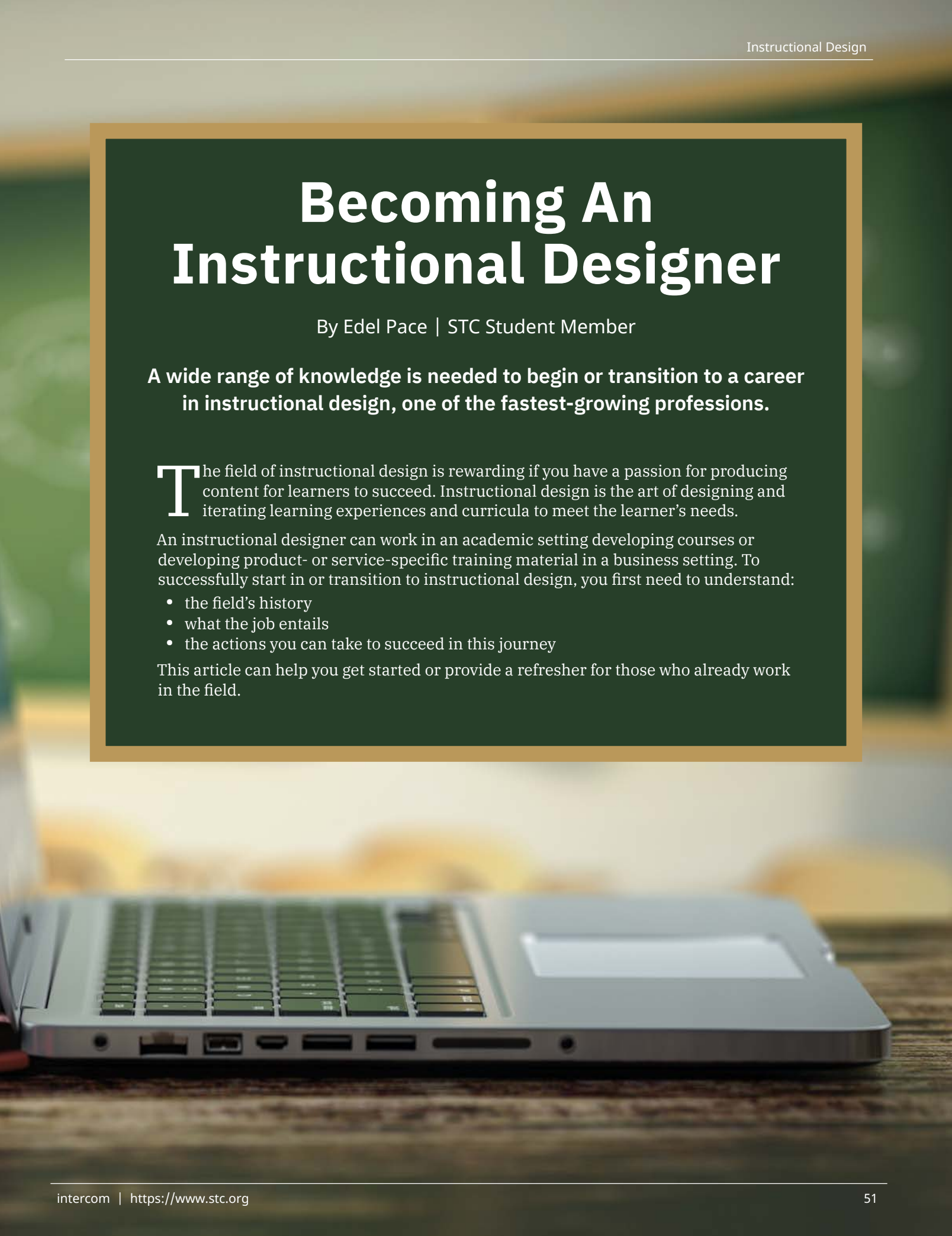
A wide range of knowledge is needed to begin or transition to a career in instructional design, one of the fastest-growing professions.

The field of instructional design is rewarding if you have a passion for producing content for learners to succeed. Instructional design is the art of designing and iterating learning experiences and curricula to meet the learner's needs.

An instructional designer can work in an academic setting developing courses or developing product- or service-specific training material in a business setting. To successfully start in or transition to instructional design, you first need to understand:

- the field's history
- what the job entails
- the actions you can take to succeed in this journey

This article can help you get started or provide a refresher for those who already work in the field.



History of Instructional Design

Instructional Design is a relatively young field, starting in the 1940s during World War II when psychologists and educators joined forces to create training material for soldiers. In the 1950s, B.F. Skinner introduced "operant conditioning," where instruction featured small steps and instant feedback, while Benjamin Bloom identified domains of learning, now known as Bloom's Taxonomy.

During the 1960s, Robert Gagné introduced "The Conditions of Learning," where he classified three domains of learning, five learning outcomes, and nine events of instruction in research, all of which are at the center of today's instructional design.

As the role of computers evolved through the 1970s and 1980s, so too did the development of information processing systems. The 1970s saw the introduction of media in instruction and the development of information processing systems.

The 1990s saw significant developments in the field with the surge of the constructivist theory. Performance and prototyping (rapid development of instructional materials with even quicker iterations) became trends. Practitioners began to develop computer-based training (CBT) for interactive training.

The 2000s established e-Learning, especially in the private sector, mainly for onboarding practices. Learning Management Systems (LMSs) and Learning Management Information Systems (LMISs) rose in importance when the need to stay organized and capitalize on reusable material became apparent.

From 2010 to today, online and hybrid learning became mainstream in academia and the corporate world, facilitated by widespread technology. The learner experience emerged as the central focus of the field with personalized instruction, and instructional designers now use data and analytics to target instruction and improve outcomes.

> **Instructional designers now use data and analytics to target instruction and improve outcomes.**

Facts about instructional design

According to the Bureau of Labor Statistics, Instructional Design is one of the fastest-growing professions, with a projected 10 percent growth between 2020-2030, where the average is 8 percent.

The field of instructional design presents various career directions or specialized niches. For example, learning design or strategy, content writing, instructional technology, e-learning development, multimedia specialist, graphic and UI/UX design, instructor training, and project management.

Instructional designers report high satisfaction with their work–life balance. According to the 2021 Instructional Design Survey by Devlin Peck, 61 percent of the surveyed responded as very satisfied, and only 6 percent were not satisfied.

The average salary is ~$64K a year, according to *Payscale*. However, it is far less than what Peck reported in his survey, where the average compensation for a full-time employee is ~$85K a year.

What Do Instructional Designers Do?

Instructional designers need to master many skills to:

- Understand their audience
- Create engaging learning experiences
- Develop instructional roadmaps
- Evaluate results
- Iterate their materials to improve student success

We devise both courses and supporting materials while staying on top of current education and technology trends. Instructional designers work in the corporate world, for governments, academic institutions, non-profits, and as freelancers, consultants, or vendors.

Debate exists about whether a degree is needed to break into instructional design, and an individual's circumstances and background might determine that answer. If "the proof of the pudding is in the eating," having an exceptional portfolio of past projects could make up for a lack of formal education.

Skills of an Instructional Designer

- A good understanding of instructional design methods (both data- and theory-driven)
- Sharp technical skills
- Graphic design knowledge
- Solid, demonstrable experience
- A strong portfolio

Instructional design theory

These are a range of theories, principles, and frameworks that an instructional designer should know:

- **ADDIE** stands for Analysis, Design, Development, Implementation, and Evaluation.
- **Merrill's Principles of Instruction** has four stages: demonstration, activation, application, and integration. Some IDs add a fifth stage, engagement.
- **Bloom's Taxonomy** has six main categories: knowledge, comprehension, application, analysis, synthesis, and evaluation.
- **Gagné's Events of Instruction** comprises nine conditions for learning: gaining attention, informing objectives, stimulating prior information, presenting content, providing guidance, performance (application), providing feedback, assessment, and transfer.
- **Action Mapping** is used in the business world. Its four steps are to identify business goals, identify what people need to do, design practice activities, and identify what people NEED to know.
- **ARCS Model of Motivation** was developed by John Keller with four components: Attention, Relevance, Confidence, and Satisfaction (ARCS).
- **Behaviorism** guides learners to reach pre-established learning outcomes. One prevalent concept is operant conditioning, developed by B. F. Skinner.
- **Cognitive Information Processing** is a psychological approach to information processing, and it focuses on how people attend, encode, store, and retrieve information.
- **Kirkpatrick's Model of Evaluation** outlines the levels at which an ID should evaluate outcomes: reaction, learning, behavior, and results.
- Mayer developed 12 guidelines in his **Principles of Multimedia Learning**, composed of these principles: coherence, signaling, redundancy, spatial contiguity, temporal contiguity, segmenting, pre-training, modality, multimedia, personalization, voice, and image.
- **SAM (Successive Approximation Model)** was developed by Michael Allen as a simplified version of the ADDIE model. His model has three phases: preparation, iterative design, and iterative development.
- **AgileISD**, developed by Conrad Gottfredson, introduced an Agile iterative approach into instructional design. AgileISD has five "moments:" align, get set, iterate and implement, leverage, and evaluate.

Technical skills

Keeping up with technological changes and advances is essential for an instructional designer. Depending on your niche, you might need to learn 1 or more of these tools used in daily activities:

- Authoring tools: Software that helps instructional designers create interactive content, for example, Articulate Storyline, Articulate Rise 360, Madcap Mimic, and Adobe Captivate.
- Web programming languages: HTML5, Cascading Style Sheets (CSS), and JavaScript.
- Learning Management Systems (LMSs): software or platforms used to deliver, track, and evaluate e-learning courses. Some well-known platforms are Adobe Captivate Prime, TalentLMS, Docebo, Articulate 360, Moodle, Canvas, EduMe, among many others.
  - Instructional designers should know about the 2 primary standards to deploy the LMS: Shareable Content Object Reference Model (SCORM) and Experience Application Programming Interface (xAPI, also known as Tin Can API).
- Multimedia: TechSmith Camtasia, TechSmith Snag-It, Madcap Capture, Adobe XD, Adobe Illustrator (Creative Cloud).

Visual design knowledge

Instructional designers need to know about design and its application in an educational setting to help present content efficiently. Having web, graphic, or multimedia design skills can set instructional designers apart when building digital materials to complement instruction. A good place to start is learning about the seven principles of design: emphasis, balance and alignment, contrast, repetition, proportion, movement, and white space.

To Succeed as an Instructional Designer

"Passionate" is a word many researchers use to describe instructional designers. If you have a passion for making a difference in someone's life, advocating for learners, love collaborative roles, and continuous learning, you have found the right field to put your expertise and skills to work.

Instructional design is a field in constant change, and as a professional, you need to evolve as well. Attributes you can seek to improve might include:

- Learning from your experience
- Empathizing with learners and understanding the needs of your key stakeholders (those who create the learning needs)
- Listening actively
- Storytelling
- Improving your technological competence
- Developing your visual design skills
- Strengthening your imagination and ability to think creatively

Instructional design is a field in constant change, and as a professional, you need to evolve as well.

Portfolio/experience

Instructional designers, especially beginners or transitioning, should create a portfolio to showcase their abilities and understanding of the field. Having a portfolio is crucial if you have no experience.

A portfolio should include:

- Information about you and your background including education related to ID
- A résumé of past jobs held (even if they are not ID-related)
- Projects**:** Include projects that reflect where you'd like to specialize. Include notes to explain your process. *These do not need to be paid projects.* Remember, prospective employers are concerned with how successful the training was and if it was received well. If you can include metrics that "prove" your training works, so much the better.

How to gain experience

After you have learned and dived into the instructional design field, you need to build your network.

Excellent ways to network and gain experience include:

- Joining professional associations such as STC (especially the Instructional Design & Learning SIG), ATD, eLearning Guild.
- Attending training Industry conferences, seminars, webinars, and events, including those hosted by STC, ATD, and Training Magazine.
- Using social media, such as LinkedIn and Twitter — specially to follow industry notables and keeping up with trends and industry thinkers.
- Joining online communities: STC, Devlin Peck, Tim Slade, Cara North, among others.
- Volunteering. Beyond the STC's special interest groups, many organizations and charities in your town or city would probably welcome a volunteer who could:
  - Create an effective onboarding package
  - Codify and improve their current training methods
  - Prepare and deliver a PowerPoint presentation on (for instance) safety practices or store opening/closing procedures

Search for instructional design job descriptions specific to the ID aspect that calls to you and see how your skills fit. Use LinkedIn for this purpose. Polish those skills and don't be afraid to apply for jobs even if you don't meet all the requirements — yet. Instructional design jobs are not static, and there is room for growth with your company or as a freelancer. Staying current with changes is

essential; dare to explore new resources and apply them to your work.

Remember, instructional design is not a one-size-fits-all kind of field. I wish you much success in becoming an instructional designer. ■

EDEL PACE (epacestudio@gmail.com), a senior at the University of Memphis studying professional writing and creative mass media and a participant of the Accelerated Bachelor to Master's (ABM) program. She is a student member of the STC and a volunteer in the Instructional Design & Learning (IDL) SIG. Edel is also a founding member and first officer of the Writing, Rhetoric, and Technical Communication (WRTC) Club, a registered student organization at the University of Memphis. She loves reading, drinking coffee, and having fun with her kids.

Books to Start

- *What I Wish I Knew Before Becoming an Instructional Designer,* by Dr. Luke Hobson
- *Map It: The Hands-On Guide to Strategic Training Design,* by Cathy Moore
- *Design for How People Learn (Voices That Matter),* by Julie Dirksen
- *The eLearning Designer's Handbook: A Practical Guide to the eLearning Development Process for New eLearning Designers,* by Tim Slade
- *The Accidental Instructional Designer: Learning Design for the Digital Age,* by Cammy Bean

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2022 Election Results

STC, the Nominating Committee, and the Board of Directors are pleased to announce the results of the 2022 STC election. Thank you to all the candidates for their contributions! ■

Vice President (three-year term)

Timothy Esposito

Secretary (two-year term)

Li-At Rathbun

Director (two-year term)

Lori Meyer

Danielle Villegas

Nominating Committee (two-year term)

Kylie Jacobsen

Mirhonda Studevant

For full election results including candidate statements, visit: **https://www.stc.org/elections/election-results-2022.**

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Online Courses and Webinars

Introduction to Instructional Design

Instructor: Melissa Justen

Asynchronous online

1 June–6 July 2022

During this six-session course students will learn what instructional design is, why it is a growing field, and learn about and research different careers in that space.

For full details and registration, visit: **https://www.stc.org/course/introd-instructional-design-0622/**

CPTC Foundation Level Exam Preparation

Instructor: Dr. Craig Baehr | CPTC Chief Examiner

Every Monday, 6–27 June 2022

4:00 PM –5:30 PM EST (GMT-4)

This four-week certification preparatory course provides an overview of the Certified Professional Technical Communicator (CPTC) Foundation level exam offered through STC and AMPG International.

For full details and registration, visit: **https://www.stc.org/course/cptc-foundation-0622/**

TechComm Fundamentals Bootcamp

Instructor: Leah Guren

Asynchronous Online

6 June–18 July 2022

This course covers key theory that you can immediately apply to your work in technical communication. Each element of theory is presented with hands-on exercises, real-world examples, and plenty of discussion.

For full details and registration, visit: **https://www.stc.org/course/tc-bootcamp-jun-2022/**

Getting More Value from DITA

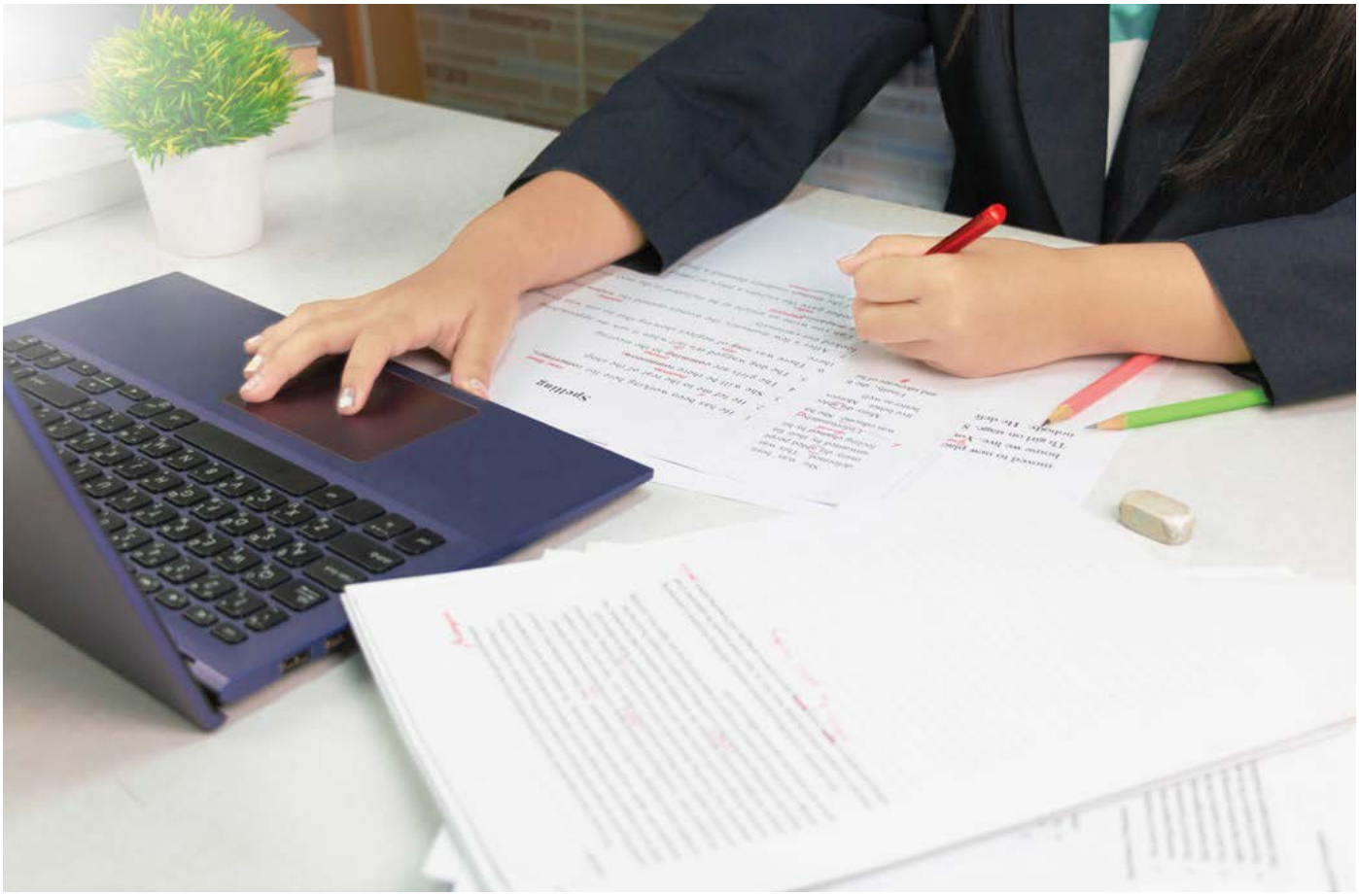
Instructor: Larry Kunz

Every Tuesday, 7 June–5 July 2022

4:00 PM–5:00 PM EST (GMT-4)

In this course, you'll learn how to realize greater efficiency and increased business value through reuse (including topic-based reuse, conref, and keyref), DITAVAL, semantic elements, and methods for troubleshooting problems. ■

For full details and registration, visit: **https://www.stc.org/course/more-value-from-dita-0622/**



Why Editing Will Always Matter

BY MICHELLE CORBIN | STC Fellow

Four years ago, I introduced you to my Editing Matters column. I was so thankful to get to share with you my passion for technical editing and try to explain all the reasons why the craft of technical editing matters. This article will be my last Editing Matters column, and I will see if I can explain why I believe that editing will always matter.

Without editing of all types,[1] information is often disorganized, unclear, or incorrect making it harder for readers to find, understand, and use that information. Without editing of all types, typos and grammatical errors add up and erode the confidence that readers have in the information (and can potentially lead to legal troubles). Without editing of all types, on more than just the words,[2] information is just information and is not accurate, complete, usable technical communication.

Editing is Teaching, Coaching, and Mentoring

One of my favorite movies as a young adult was *Dead Poets Society*.[3] Mr. Keating is an English teacher who inspires his students through unorthodox teaching methods. I definitely see editors as teachers, using orthodox (and unorthodox) teaching methods to teach writers and SMEs how to be

better writers and how to communicate effectively through our editing comments but also through our interactions on the team. A team will always be better for having someone being the advocate for the users[4], being the arbiter of quality,[5] and mentoring and coaching the team[6] from start to finish.

> **Editing will always matter because quality will always matter.**

Editing is Behind the Scenes

One of my favorite movies from my childhood (OK, and as an adult, too, if I'm being honest) was *The Wizard of Oz*.[7] One of the best quotes of the movie is, "Pay no attention to that man behind the curtain." As editors, we are often seen as "the great and powerful" editor (I'd like to think so anyway) working "behind the curtain," applying the rules and conventions[8] of the style guide, making sure everyone on the team is being consistent with their words and avoiding gobbledygook,[9] all while keeping the users at the forefront of our minds.[10]

Editing is Invisible

One of my favorite TV shows these days is *Penn & Teller Fool Us*,[11] which is a magic competition show where magicians try to fool the master magicians, Penn & Teller. My favorite magic tricks are the up-close sleight-of-hand tricks, where so much is invisible to the untrained eye. Editors are like magicians, where the craft of editing, of editing more than just words,[2] of editing to improve SEO,[12] is truly invisible to the users.

In the End...

I have had so much fun writing this column, coming up with punny headings and riffing on movies and songs. However, the time has come for me to stop repeating myself (I think I only mentioned that editing is quality assurance or that editors are the arbiters of quality eight or so times in the last four years). I know that whether you are editing your own writing, editing the writing of SMEs, or editing the writing of other technical writers,[13] you all get it — that editing will always matter because quality will always matter. ■

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MICHELLE CORBIN covers matters (topics) about editing that matter (are of consequence) to communicators of all kinds. It has been my honor to write about the ins and outs of editing and what you can do to improve the quality of your content. I may or may not continue to post about editing matters sharing to my LinkedIn: https://www.linkedin.com/in/michellelcorbin/.

My STC Journey

BY AIESSA MOYNA | STC President

My STC journey began during my freshman year at New Mexico Tech. As a student in the technical communication program, I learned that participation in the local STC student chapter was required. Membership wasn't mandated because many of us had student jobs that paid just enough to cover books, supplies, and essentials like food and shelter. We were, however, expected to attend the monthly gatherings, which usually featured a short business meeting, a speaker, and refreshments (free food is always a draw on college campuses). Running for chapter office was optional, although anyone willing to serve as president, vice president, secretary, or treasurer was eligible to have their STC student membership covered by the chapter.

During my first three years in the program, I somehow managed to scrape together the annual student dues — I figured that if I was going to attend the meetings anyway, I might as well get all the other benefits of membership, including the publications, which proved to be great resources for research papers. As a senior, I served as president of the student chapter, earned membership in the Sigma Tau Chi honor society, and presented at my first STC annual conference (before we called it the Summit). During my time at New Mexico Tech, I found that the most valuable benefit of my affiliation with STC was the ready-made network it provided. Participation in the student chapter enabled me to attend "professional" chapter meetings in Albuquerque, Las Cruces, and Los Alamos, which led to work-study opportunities, internships, and eventually my first paid job as a technical communicator after graduation.

> **I get the most from my STC membership when I give something back and participate as an active member and volunteer.**

In the years since, I have continued to benefit from the Society's formal educational offerings, STC-level and regional conferences, job boards, mentoring, chapter and SIG meetings with speakers who introduced me to new concepts and tools, participation in local and regional competitions as both a submitter and judge, plus opportunities to network and learn from others working in the field. I also have continued to find that I get the most from my STC membership when I give something back and participate as an active member and volunteer.

As I begin my service as president of the Society, I'm excited to see what the next year brings. I am honored to serve the organization that has consistently supported me throughout my career, and I look forward to meeting new people and making new connections. Most of all, I'm eager to work with the Board of Directors and STC staff to continue offering programs and services that will help other technical communicators advance in their own careers.

What have been the most valuable aspects of STC membership for you? What programs and services do you find most useful? What new offerings would you like to see? Please get in touch! I would love to know what you think STC is doing well, what we could do better, and how we can support you as a tech comm professional, educator, or student, or as an STC leader. ■

AIESSA MOYNA (amoyna.stc@gmail.com) is the 2022-2023 president of STC. Her recurring column will provide updates and insights on Board activities and solicit member feedback to guide ongoing decision-making.

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Points may be obtained the following ways:

Event	Points
STC Annual Membership (any membership type for Foundation certificants)	2
STC Recorded Webinar (self-study)	1
STC Live Educational Webinar (free, sponsored, and community webinars excluded)	2
STC Online Courses	6
STC Summit Pre-Conference Courses (full day)	6
STC Summit Pre-Conference Courses (half day)	3
STC Annual Summit	8
Begin and complete a college-accredited course related to the Technical Communication field	8
Published articles that relate to any aspect of *Technical Communication* (2/article)	2
Published books publicly available on topics related to *Technical Communication* (5/book)	5
Presentations at conferences related to aspects of *Technical Communication* (2/presentation)	2
Total needed within 2 years post-certification date	**12**

Fees

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